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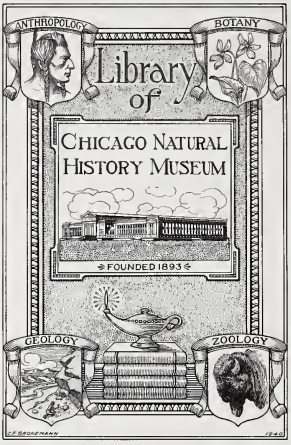

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AUCKLAND MUSEUM CONCHOLOGY CLUB

BULLETIN No. 1. AUCKLAND, NEW ZEALAND. 1st NOVEMBER, 1940.

The Auckland Museum Conchology Club was founded in 1930 as a Boys' Club, and during the past five years has functioned as a club for both adults and juniors. The only qualification for membership is an interest in conchology or zoology in general. The membership consists of ordinary members and corresponding or associate members and the Club's activities cover a monthly series of evening meetings and organised field trips.

This pamphlet initiates a modest annual publication in which is recorded the officers for the year and the lecture syllabus, but the main purpose of the pamphlet is to keep members informed in respect to publications relevant to their studies and to publish field notes of local importance in zoology as well as other short original contributions.

This issue is almost entirely devoted to a supplementary list covering all additions and alterations to the check-list of the Recent shellfish of New Zealand which appeared in "The Shellfish of New Zealand," Powell 1937, The Unity Press Ltd., Auckland, pp. 54-99.

The members of this Club welcome correspondence with members of kindred clubs and societies.

OFFICERS, 1940.

Chairman: Mr. A. W. B. Powell. **Librarian:** Miss M. Holloway.
Committee: Miss M. Holloway, Mr. E. J. Rea, Mr. R. K. Dell.
Hon. Secretary: Mr. F. W. Short.

SYLLABUS, 1940.

"Amongst the New Zealand Shells—Display of the Collections"—1/2/1940.
"Shore Life of the Auckland West Coast," Mr. R. K. Dell—7/3/1940.
"The Extinct Shellfish Life of New Zealand," Mr. A. W. B. Powell—4/4/1940.
"Investigations on Southern Hemisphere Sea Birds," Mr. C. A. Fleming—2/5/1940.
"How Shellfish Grow Up," Mr. A. G. Stevenson—6/6/1940.
Results of the Season's Collecting Trips. Symposium by Members of the Club—4/7/1940.
"Shellfish of the North Shore Reefs," Miss N. Houghton—1/8/1940.
"Some Coastal Plants," Miss B. Molesworth—5/9/1940.
"Exotic Shells. The History of Shellfish Study," Mr. A. W. B. Powell—3/10/1940.
Annual Meeting and Members' Display of Specimens—7/11/1940.

Note.—The numbers preceding the names refer to the sequence in the 1937 Check list; and an asterisk denotes a species new to the fauna.

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1. —Solemya (Zesolemya) parkinsoni E. A. Smith, 1874. (Zesolemya Iredale, 1939, p. 233.)
4. —Ennucula strangei A. Adams, 1856. (Ennucula Iredale, 1931, p. 202.)
*12.1—Austronucula schencki Powell, 1939. (Austronucula Powell, 1939, p. 220) F.
29. —Glycymeris (Grandaxinea) laticostata (Q. & G. 1835) (Grandaxinea, Iredale, 1931, p. 202).
30. —Glycymeris (Glycymerula) modesta (Angas, 1879) (Glycymerula Finlay & Marwick, 1937, p. 23).
*59.1—Legrandina turneri Powell, 1939 (p. 221) F.

Modiolus Lamarck, 1799 (Mytilus modiolus L.) in place of Volsella.

Musculus Bolten, 1798 (Mytilus discors L.) in place of Modiolaria.

*75.1—Chlamys gemmulatus (Reeve, 1853). Iredale (1939, p. 354) recognises this as a deep water form of radiatus, from stomachs of blue cod from Cook Strait.
87. —Dimya (Dimyarina) maoria Powell, 1937. (Dimyarina Iredale, 1936, p. 269).
*108.1—Kidderia rakiura Powell, 1939 (p. 223) F.
117. —Cuna (Hamacuna) otagoensis Powell, 1927 (Hamacuna Cotton, 1931, p. 350).
*132.1—Pleuromeris paucicostata Laws, 1940 (p. 48) C.
*146.1—Benthocardiella rakiura Powell, 1939 (p. 223) F.
*155.1—Thyasira (Parathyasira) otagoensis (Suter, 1913) (S.1, p. 919) F. (omitted previously).
161. —Marikellia rotunda (Deshayes, 1856) (Powell, 1939, p. 213) (Marikellia Iredale, 1936, p. 274; Powell, 1939, p. 213).
*168.1—Puyseguria tani Powell, 1939 (p. 225) F.
178. —Rochefortula bidentifera (Powell, 1933).
*182.1—Rochefortula decapitata Powell, 1939 (p. 226) R.F.M.
*182.2—Rochefortula taieriensis Powell, 1939 (p. 226) F.
236. —Notocallista (Striacallista) multistriata (Sowerby, 1851) (Striacallista Marwick, 1938, p. 68).
*304.1—Haliotis virginea morioria Powell, 1938 (p. 165) M.
*309.1—Tugali stewartiana Powell, 1939 (p. 227) F.
*372.1—Margarella turneri Powell, 1939 (p. 227) F.
*372.2—Margarella puysegurensis Powell, 1939 (p. 228) F.
*384.1—Maurea (Mucrinops) punctulata ampla Powell, 1939 (p. 229) F.C.
*429.1—Zalipais turneri Powell, 1939 (p. 230) F.
*527.1—Zelaxitas rissoaformis Powell, 1939 (p. 230) F.
*552.1—Subonoba edita Powell, 1939 (p. 231) F.
*582.1—Merelina harrisonae Powell, 1939 (p. 231) F.
*582.2—Merelina maoriana Powell, 1939 (p. 231) F.
*585.1—Merelina taupoensis Powell, 1939 (p. 232) A.
*644.1—Scrobs trailli Powell, 1939 (p. 233) F.
*754.1—Struthiolaria papulosa gigas Sowerby, 1842 (Powell, 1939, p. 234) F.

Trichosirius Finlay 1926 (Type: Trichotropis inornata Hutton) in place of Cerithioderma.

*786.1—Trichosirius cavatocarinata (Laws, 1940) (p. 52) F.
*813.1—Tonna maoria Powell, 1938 (p. 166) A.
*833.1—Philippia manifesta Iredale, 1931 (Powell, 1938, p. 168) A.
*842.1—Odostomia pervaga Laws, 1939 (p. 197) C.
*842.2—Odostomia geoffreyi Laws, 1939 (p. 197) C.
*842.3—Odostomia vaga Laws, 1939 (p. 199) C.F.
*842.4—Odostomia haurakiensis Laws, 1939 (p. 204) C.
*842.5—Odostomia pedica Laws, 1939 (p. 205) R.
*842.6—Odostomia aucklandica Laws, 1939 (p. 205) R.
*842.7—Odostomia parvacutangula Laws, 1939 (p. 207) R.
*842.8—Odostomia manukauensis Laws, 1939 (p. 208) C.
*842.9—Odostomia sherriffi (Hutton, 1883) (Laws, 1939, p. 200) A.
843. —Agatha georgiana (Hutton, 1885) (Agatha Adams, 1860) (Laws, 1940, p. 151).
848. —Puposyrnola fastigiata (Suter, 1907) (Puposyrnola Cossmann, 1921).
848.1—Puposyrnola missile Laws, 1937 (p. 308) A.C.
856.1—Gumina minor Laws, 1940 (p. 53) C.
856.2—Striodostomia orewa Laws, 1940 (Genus and sp., p. 156) C.
857. —Odostomia chordata Suter, 1908 (not Evalea).
861. —Finlayola lurida (Suter, 1908) C. (Finlayola Laws, 1937, p. 311).
866. —Terelimella larochei (Powell, 1930) (Terelimella Laws, 1938, p. 58).
867. —Terelimella aupouria (Powell, 1937) (Eulimella).
*874.1—Chemnitzia zealandica axivarians Laws, 1937 (p. 61).
*880.1—Chemnitzia errabunda Laws, 1937 (p. 53) C.F.
*880.2—Chemnitzia dunedinensis Laws, 1937 (p. 54) F.

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*880.3—Chemnitzia kingi Laws, 1937 (p. 54) C.
*880.4—Chemnitzia verecunda Laws, 1937 (p. 55) C.
*880.5—Chemnitzia forsteriana Laws, 1937 (p. 56) F.
*880.6—Chemnitzia bucknilli Laws, 1937 (p. 56) C.
*880.7—Chemnitzia jactura Laws, 1937 (p. 57) F.
*880.8—Chemnitzia waitemata Laws, 1937 (p. 58) C.
*880.9—Chemnitzia cookiana Laws, 1937 (p. 59) C.
*880.10—Chemnitzia stipes Laws, 1937 (p. 59) A.
*880.11—Chemnitzia vegrandis Laws, 1937 (p. 59) F.
*880.12—Chemnitzia owenga Laws, 1937 (p. 61) M.
*880.13—Chemnitzia barrierensis Laws, 1937 (p. 61) C.
*880.14—Chemnitzia vigilia Laws, 1937 (p. 63) C.
*880.15—Chemnitzia scala Laws, 1937 (p. 65) F.
*880.16—Chemnitzia lillingtoniana Laws, 1937 (p. 65) F.R.
*880.17—Chemnitzia mitis Laws, 1937 (p. 65) C.M.
*880.18—Chemnitzia rakiura Laws, 1937 (p. 66) F.
*880.19—Chemnitzia informis Laws, 1937 (p. 67) C.
*880.20—Chemnitzia acer Laws, 1937 (p. 68) F.
*880 21—Strioturbonilla taiaroa Laws, 1937 (p. 170) F. (Strioturbonilla Sacco, 1892).
*880.22—Pyrgiscilla otakauica Laws, 1937 (p. 175) F. (Pyrgiscilla Laws, 1937, p. 172).
*880.23—Striarcana cryptolira Laws, 1937 (p. 180) A.C.M. (Striarcana Laws, 1937, p. 179).
*880 24—Striarcana tauranga Laws, 1937 (p. 180) C.
898. —Venustilifer bountyensis (Powell, 1933) (Venustilifer Powell, 1939, p. 234).
*960.1—Austrosipho (Verconella) chathamensis Powell, 1938 (p. 167) M.
*973.1—Austrofusus glans tragulatus Iredale, 1937 (p. 107) F.

Leporemax Iredale, 1937 (subgenus of Alcithoe). Type: Voluta gracilis Swainson (= Carolluta Iredale, 1937. Type: Fulguraria hedleyi (Murdoch & Suter).

1088. —Alcithoe (Leporemax) fusus (Q. & G., 1833) (= gracilis Swainson).
1089. —Alcithoe (Leporemax) hedleyi (Murdoch & Suter, 1906).
*1086.1—Alcithoe ostenfeldi (Iredale, 1937) (p. 105) F. (Gilvostia n. gen. Ired., 1937, not distinguishable from Alcithoe).
1146. —Neoguraleus sinclairi (Gillies, 1882) (Neoguraleus Powell, 1939, p. 236).
1147-1150—Neoguraleus (not Guraleus).
1150.1—Neoguraleus murdochi (Finlay, 1924) (Powell, 1939, p. 236) A.C.F.
1171. —Neoguraleus amoena (Smith, 1884).
*1161.1—Maorimorpha suteri (Murdoch, 1905) C.F. (Maorimorpha Powell, 1939. p. 235.)
1163. —Comitas trailli (Hutton, 1873) (S.1, p. 478) F. (Comitas Finlay, 1926).

Aoteatilia Powell, 1939 (Daphnella substriata Suter) Pyrenidae, not Turridae.

1164. —Aoteatilia substriata (Suter, 1899) (Powell, 1939, p. 235) F.
1167. —Aoteatilia acicula (Suter, 1908) (Powell, 1939, p. 235) F.
1169. —Aoteatilia psila (Suter, 1908) (Powell, 1939, p. 235) C.
1170. —Aoteatilia tenuistriata (Suter, 1908) (Powell, 1939, p. 235) R.
1239. —Sphaerostoma flemingi Powell, 1937 (p. 120) C.
1276. —Hermaea aoteana Powell, 1937 (p. 123) C.
1277. —Elysia maoria Powell, 1937 (p. 121) C.
1289. —Kerguelenia macquariensis Powell, 1939 (p. 238) R. (not redimiculum).
1290.1—Kerguelenia stewartiana Powell, 1939 (p. 238) F.
1358. —Delete: duplicate of 1351.
1426. —Fectola (Subfectola) caputspinulae (Reeve, 1852) (Subfectola Powell, 1939, p. 238).
1426.1—Fectola (Subfectola) rakiura Powell, 1939 (p. 238).

Macristylus Haas, 1935 (Bulimus shongii Lesson) (p. 189).

Basileostylus Haas, 1935 (Placostylus bollonsi Suter) (p. 189).

1504. —Pl. (Maoristylus) ambagiosus Suter, 1906.
1504.1—Pl. (Maoristylus) ambagiosus annectens Powell, 1938 (p. 148).
1504.2—Pl. (Maoristylus) ambagiosus consobrinus Powell, 1938 (p. 149).
1504.3—Pl. (Maoristylus) ambagiosus priscus Powell, 1938 (p. 149).

ELASMATINIDAE.

Tornatellinops Pilsbry 1915 (Type: Tornatellina novoseelandica Pfeiffer.)

1505. —Tornatellinops novoseelandica (Pfeiffer, 1853) (Iredale, 1937, p. 300).
1520.1—Paryphanta hochstetteri anatokiensis Powell, 1938 (p. 133).
1525.1—Paryphanta lignaria oconnori Powell, 1938 (p. 134).
1529.1—Paryphanta unicolorata rotella Powell, 1938 (p. 137).
1529.2—Paryphanta gagei Powell, 1938 (p. 136).
1529.3—Paryphanta fletcheri Powell, 1938 (p. 135).
1532.1—Paryphanta gilliesi brunnea Powell, 1938 (p. 138).
1539.1—Paryphanta traversi tararuaensis Powell, 1938 (p. 138).
1543.1—Schizoglossa major Powell, 1938 (p. 139).

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The following recently published books and papers may interest members:—

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F. W. SHORT,
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BULLETIN NO. 2

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PREFACE

Owing to the fact that many of our members departed overseas in the forces, while others became engaged in wartime duties at home, all official club activities were cancelled for the duration of hostilities and the intention in 1940 of publishing a bulletin each year was not realised.

Meetings were resumed in May, 1945, with a membership of 50, including a number of corresponding members in all parts of New Zealand.

Due largely to the efforts of Mr. E.S. Richardson the club decided this year to publish Bulletin No.2 to be made up of articles and notes of interest contributed by club members. As the great majority are quite unused to such writing the Committee greatly appreciates the efforts of everyone who has made an attempt and so enabled us to publish a bulletin once more. It was decided that in view of the great difficulty in getting printing done and the high costs involved the Bulletin this year would be in folio form with cyclostyled sheets.

We wish to thank Mr. A.W.B. Powell, who read and checked the articles, also Mr. T.V. Stein, who gave us invaluable help by printing the folios for us and obtaining the paper which is in such short supply. Our thanks are due to our Chairman, Mr. F.W. Short and Miss G.Miller without whose help in cutting and cyclostyling the stencils, this Bulletin could not have been printed.

E.N.Houghton,
Hon. Secretary.

December, 1946.

NOTES ON METHODS OF COLLECTING

R.K.DELL

The amateur shell collector often fails to obtain the full range of species from a given locality through failure to investigate all possible habitats. These notes have been compiled in the hope that they may bring to the notice of readers some ideas that will be new to them. They make no claim to originality and have been gleaned from many sources. In most cases they have been tested personally with varied success. The writer hopes that no conchologist will feel his own idea has been "pirated" and acknowledges his indebtedness to many friends and authors for the following ideas.

Some knowledge of the tides is a necessity for any marine collector and this aspect need not be stressed. It is often an advantage, however, especially in an unknown locality to arrive at the collecting ground some two hours before dead low water and to follow the tide down. In this way the whole area is covered and species which frequent the higher levels will not be missed and the maximum of time may be devoted to the lower, usually more productive zones. High tidal rocks are often neglected and such species as Leuconopsis obsoleta, Marinula filholi, Siphonaria zelandica, Notoacmaea scopulina, Risellopsis varia (live specimens) and Maorichiton metonomazus are missed. In a paper in the Transactions of the N.Z. Institute, Volume 63, Powell described an interesting molluscan community from high tidal rocks imbedded in mud on Rangitoto Island. The outstanding novelty here, Rangitoto insularis was long believed to be found only in this locality. Recently apparently its range has been increased by records from elsewhere. It may yet prove to be quite widespread though previously not noted because of its unpromising habitat. The small gastropod Fossarina rimata is to be found alive sheltering beneath the shells of the rock oyster - another species which can be collected while the conchologist is waiting for the tide to go out.

On the West Coast high tidal caverns often repay investigation. A torch is useful in such situations. Quite often good clean specimens of shells which are encrusted and dirty elsewhere are found in such locations.

The high tidal level on sandy beaches usually receives a good deal of attention especially after a good "blow". There are often bands of heavier material washed up at lower levels and good specimens may be obtained there. Shell sand is a rich source of small material. The main point in collecting such material is that it may be taken home in bulk and carefully searched at leisure. The best place for collecting shell sand is often at the end of a bay where a reef or headland acts as a trap for drifting material. Here from mid-tide to low tidal mark pockets of shelly debris are often encountered, rich in specimens from half an inch in length downwards. The after treatment of shell sand is important. The material should be spread out to dry and then passed through sieves of varying mesh so that several grades are obtained. This facilitates sorting. The sand may then be examined in small quantities under a lens and small shells removed with a small moistened brush. Tweezers are not recommended as fragile specimens are too easily damaged.

Some species live in the shelter of the short limy red algae, Corallina. These may be obtained by teasing out lumps of the seaweed in fresh water and leaving all to soak in a basin for an hour or so. The weed may then be removed and the residue dried and treated as shell sand. Most short bushy algae will repay treatment in this way as will the holdfasts of larger forms. Such "seaweed washings" often contain live shells which are not otherwise obtained. The holdfasts of the bull Kelp, Durvillea support a fauna of their own -, Chitons, bivalves and gastropods all being represented. Some species of Margarella are found in seaweed holdfasts is the Forsterian province.

Boulders at low tide are of course the collecting place de luxe, for the marine conchologist. A small steel crowbar is a decided asset in such spots and should find a place in the collecting kit. Many large boulders which do not respond to the usual treatment can be overturned easily with its assistance. Rock ledges near low tide mark deserve attention. This is the place to search for live Pteronotus eos in the Bay of Islands and on the Auckland West Coast Gadinalea nivea is found in similar spots or upon the roofs of small caverns though seldom elsewhere. The latter may be dislodged without injuring the shell by throwing hot water over the shells and collecting the specimens as they fall off. The resourceful conchologist will of course carry a full thermos flask for such eventualities!!

Boulders just below low water mark may profitably be carried ashore and examined in comfort. A small tray made from a cut-down kerosene tin is a useful accessory. If boulders are placed in the tray any specimens which fall off will not be lost. When collecting in bulk the boulders may be held above the tray and the attached molluscs brushed off into it. In this way large areas may be covered quite rapidly and the catch can then be examined at leisure. This is a particularly useful method in a locality which cannot be visited often or when time is short.

The Chitons as a group are often neglected although a little care expended in preparation will result in very attractive specimens. They are best tied down as soon as they are removed from the substratum. Slips of glass or thin, flat pieces of wood will be found most convenient for preliminary mounting. As soon as the animal is collected it should be pressed tightly against the glass slip and tied down with a couple of turns of tape or string. Specimens with wide girdles should have the girdle spread out and padded with cotton wool. The slips and attached animals may then be dried or soaked in spirits for several days. The animal may be removed or left in to dry and the specimens removed from the glass slides. Particularly choice specimens are shown to advantage when tied down on a glass slide and preserved in small tubes of Spirits. For careful work some specimens should have the valves separated and mounted upon cards.

Nudibranchs or sea slugs are another sadly neglected group in New Zealand. Although their transient beauty can never be adequately preserved a certain amount of success may be attained. The first New Zealand student who seriously studies these forms will almost certainly encounter many novelties. If removed from the water these creatures turn into balls of shapeless matter and if preserved in this form are often useless. Specimens should be placed in a basin of sea water and allowed to expand. Habit sketches and colour records made at this stage are invaluable. Before they can be preserved the animals must be norcotised. This may be accomplished by the use of a variety of substances. Epsom Salts is possibly the easiest and cheapest. It should be added, a small quantity at a time until the animal no longer contracts when touched. The specimens may then be removed to a weak solution of formalin. This should be changed several times before the nudibranchs are settled down in their final preservative. The secret of success as regards preservation is to use formalin of just sufficient strength to preserve without harming. If the formalin is too strong all colour will be removed. Experimentation alone will show what strength is most suitable. The preserved specimens should be stored away from the light. Using the above methods the writer has been successful in preserving the colour of specimens of Rostanga for over seven years.

Land snailers may borrow a technique from the entomologist and "beat" for small species. A white cloth stretched loosely over a wire frame, a stout stick and several small tubes are all that is required. The frame is held under vegetation, fern fronds, rotten stumps etc. The plant material is then tapped smartly with the stick whereupon snails and other debris fall down onto the frame. The snails are easily seen upon the white cloth and may easily be picked off. Good hauls are often obtained from the half-dry fronds of tree ferns which have been lying on the ground for some time.

The amateur collector too often tends to think that dredging is beyond his powers. Quite good results may be obtained with home-made dredges from rowing boats providing a little patience is exercised in developing a technique. Some exceptionally good work was done off the British coasts by amateurs working from small sailing craft and there is no reason why New Zealanders should not emulate their efforts.

A few words with regard to the preservation of the fauna may not be out of place. When turning over rocks in search of specimens the extra effort needed to replace them should be exerted. If rocks and boulders are left in a reversed position many of the fixed animals will not be able to shift and many will be exposed and die. In this way larval forms and juveniles may be destroyed and the whole complex series of relationships between associated animals and algae is upset. The collector who is careless in such matters may easily and rapidly change the whole character of an area.

When collecting numbers of specimens especially for exchange care should be taken to remove and preserve complete, well formed shells only. Most collectors will have found that they have collected a number of useless specimens in each large batch of shells. If these had been left they may well have become the parents of healthy generations. As it is they are worse than useless.

As the number of collectors in New Zealand grows unless each individual exercises some form of individual self-discipline the molluscan fauna which after all is the important factor will suffer irreparable damage.

In closing these notes it may be worth noting that the day, when the New Zealand conchologist considered his main occupation to be the discovery of new species and the stabilizing of the taxonomy of known species, is rapidly passing. New species undoubtedly remain to be discovered especially from deeper water localities but the emphasis is falling more and more upon problems of distribution and upon study of the actual individuals in their natural environment. While the assessment of results is in the main a task for the museum specialist, the amateur is in a better position to acquire much of the relavent data. It is towards these ends that we must attempt to train ourselves.

A COLLECTING TRIP TO THE FAR NORTH OF NEW ZEALAND: E.T.B.WORTHY

As I have always been interested in collecting shells, not that I am a collector myself, but for the fact that my wife is a keen conchologist and my "finds" are always acceptable to her, I offered to drive my two friends Messrs A.W.B.Powell and A.C.O'Connor to the far north when they told me that they were unable to get transport for this trip of theirs.

The trip was planned for a fortnight and as we would be miles away from any shops etc. all food (for this trip) was taken with us besides the necessary camping gear. So it was a well laden car that left Auckland on the morning of 22nd February 1946, on the long trip north.

The first stop was Kaco, 200 miles north of Auckland, and as we arrived early my two friends spent an hour or two in a nearby patch of bush, returning with a fair catch of "Paryphanta busbyi" and "Rhytida dunniae".

Next morning saw us away to an early start and Awanui was reached before lunch. From then on the roads deteriorated in their surface and one had to exercise care to avoid pot holes and patches of sand. After passing Te Kao, 70 miles north of Awanui, the roads for the rest of the trip were unmetalled, but their surface was fair and we finally made our goal for the day at the residence of Mr.Watt on the shores of Parengarenga Harbour. He had been advised of our pending arrival and had made arrangements for transport to Spirits Bay with the Maoris at Te Hapua which is on the opposite side of the harbour. We had been told that the road from Te Hapua to Spirits Bay a distance of 10 miles was far too rough for a car and as I was not looking for a breakdown we decided to leave the car at Mr.Watt's and proceed north by horse transport. As the Parengarenga Harbour is rich in shell fish I collected quite a few "Mayena australasia" and "Monaplex parthenopeus" from the mud flats opposite our camp for the night.

Next morning we loaded our gear into a launch that landed us at Te Hapua at 8 a.m. We expected to see our horse drawn conveyance all ready for us with both driver and horses rearing to go, but alas, we were sadly disappointed. None of the Maoris who were on the wharf watching us with idle curiosity knew anything about transport arrangements for us. Finally Mr.Powell, who knew most of the "locals" contacted one who knew a little about our needs, with the result that we finally got in touch with our prospective driver. He seemed none too keen to make the trip and said his horses were not too good, and above all, wanted to know "how much the trip was worth". Eventually he arrived with two skinny horses and a broken down old buggy which I immediately christened "The Spirits Bay Express". I don't think the Maori saw my joke. With our gear loaded there was just room for Mr.O'Connor and myself in the buggy besides the driver, so Mr.Powell walked ahead and it was not long before he had left us behind, such was our speed. The road was certainly rough with deep washouts running in all directions and we often found ourselves going along at an angle of 45 degrees. On the down hill grade the driver put the horses into "top gear" in an effort to try and catch up with Mr.Powell, but failed to see a washout ahead with the result that the front axle (which was only wood) partly broke, and the wheels came in towards each other.

This was about 4 miles from Spirits Bay and we passengers then had to walk the rest of the way. Every minute we expected to see the buggy fall to pieces and have the pleasure of carrying our gear the rest of the way, but luck was with us, and apart from picking up numerous articles of gear that fell off our "express" we finally made camp at 3.30 p.m. After a hasty lunch we repaired the broken axle with wire, and dispatched the driver on his return journey. Our camp was made right on the side of the road in a patch of scrub, and our fire was on the side of the road itself. We were at the extreme end of the King's Highways in the far north so had no worries from passing traffic.

As we were all keen to explore the surrounding country and had a few hours of daylight left we made a start with our collecting on a hill a mile or so away from camp, where a wonderful view was obtained of Spirits Bay and surrounding coast line. Tea was had by candlelight and it was a rather tired but happy party who finally crawled into our 8 x 8 tent for the night.

Next morning breakfast and all camp chores were finished before 8 a.m. when we made tracks for Unuwhao, a good 1½ hours up hill walk from camp. This Unuwhao, is the highest point in this area being about 958 feet high and surrounded by thick bush, Collecting that day was for "Placostylus ambagiosus annectens" and a few were discovered besides the rare "Paryphanta watti."

This "Paryphanta watti" seemed very exclusive as we found out later, for it worked out at only one specimen for each four hours collecting by three people, not very profitable work. Most of the "Placostylus" had little covering on them here, being found under Karaka leaves or in "cuttie grass", while at the other spot where we had collected on the previous evening, a new sub-species, was found to be in amongst flax and under Karaka leaves, but all took some hard searching to discover them. That night while we sat round our camp fire, after a good swim and wash in the tidal creek a little distance from camp, and enjoying a smoke, we discussed our plans for the morrow, deciding to go back to our first days collecting spot which proved quite a good decision as collecting was quite fair there. This time the vegetation was again Karaka, with silver Rangiora as well for food for these land snails.

The fourth day of our stay we decided to go our various ways. Mr.O'Connor decided to do beating and searching for "small stuff" in a patch of bush near a waterfall, this systematic searching proved most profitable as quite a variety was produced including the rare "Serpho matthewsi" and "Gerontia cordelia". A large new species of "Liarea" first found by Mr.Powell some years ago turned out to be fairly abundant. Mr.Powell, who in my opinion is a gifted artist spent most of the day in painting views of the surrounding hills. As for myself, with promises of sea shells for my wife still fresh in my mind, I spent most of the day on the beach. This beach is rich in old Maori history and an old Maori legend has it, that from a headland at the far end of the bay the spirits of their ancestors departed for another world. It is also unique in the fact that it is the most northerly point at which a European is buried. On a rock a plate suitably inscribed, states that from this rock the ashes of the late Col. Allen Bell was scattered. Colonel Bell was a great advocate for the north and did much to improve its conditions and make its assets more well known to the rest of New Zealand and abroad.

The 1st March saw us ready to leave Spirits Bay for pastures new, and according to pre arrangements a light truck arrived at 12 noon to take us back to Mr.Watt's a distance of some 25 miles. By 3 p.m. our car was repacked and we set out for Te Paki the most northerly and one of the largest sheep and cattle stations in New Zealand with an area of over 40,000 acres. The trip to Te Paki took us past some likely looking patches of bush where later we tried collecting for "Paryphanta watti" and added a few more to the catch. I might state here, that although we had some of this "Paryphanta watti" many were not perfect specimens. In my opinion their comparative frailness compared with their cousins "Paryphanta busbyi" and attacks from pheasants, pigs and even rats, caused their many injuries. We had found many half shells at Unuwhao testifying to my previous statement. At Te Paki we were invited to stay in the homestead, Mr.Powell who knew Mr. & Mrs.Kean personally had asked permission for us to pitch our tent in one of their paddocks, but our hosts would not hear of that being done, and made us very welcome in their home. I must say a good bed and sheets felt heavenly that night after our camping beds of titree and fern on the hard ground.

Next day we headed for Cape Maria van Diemen and after leaving the road and driving down a spur we had a good long walk before reaching the Cape. Here we were among the fossil beds and collected "Placostylus" of different

species in their fossil state, together with other fossils of land shells, all most interesting types. My companions decided to explore deeper into the fossil beds of these sandhills while I walked along the coast from Cape Maria to Cape Reinga and back, collecting marine shells, which were not too plentiful at all. Next morning Mr.O'Connor was on the sick list and was unable to accompany us on the collecting trip that day. Only a very few shells were collected that day but were good and whole specimens so were worth having, One very likely looking patch of bush proved far too dense to push our way into, so if any snails were there, they are still quite safe from collectors' hands.

Next day Mr.O'Connor felt a little better and able to stand the return trip, so we decided to make our way south again on our homeward journey. Leaving our Te Paki host and hostess about 9 o'clock in the morning we made our next stop at my brother-in-law's home a few miles north of Kaeo. He has several patches of bush on his property which are rich in "Paryphanta busbyi", this was proved by Mr.Powell who searched a small patch not 400 yards from the homestead for an hour or two, and returned with several perfect specimens of "Paryphanta busbyi". On the way home next day we passed Lake Omapere and were lucky enough to come away with a number of specimens of the freshwater bivalve "Hyridella menziesi acutus". That evening at 6 p.m. we arrived in Auckland and after bidding farewell to Mr.Powell, Mr.O'Connor and I made fast time to my home at Patumahoe a distance of 30 miles.

All was excitement and activity in our home when the catch for the trip was unpacked and examined and as all the expenses had been shared equally, so was the catch and we were all well and truly satisfied and pleased, especially my wife. As all the land snails were alive on arrival home I was busy for the next day or so making cages in which to keep the various species.

Now after seven months in captivity one of the "Paryphanta watti" has laid an egg, but this happy event was soon marred by tragedy, as 3 days later this "watti" died, perhaps from "heart failure"???

Since the above notes were compiled three more eggs have been laid by the other 'Paryphanta watti" while one 'Placostylus ambagiosus annectens" has produced a nest of 31 eggs.

COLLECTING MAUREA TIGRIS: WM.P.THOMSON

One of the worth-while places within reasonable distance of Auckland for the collector to visit is Whatipu at the entrance of the Manukau Harbour (North Head), but the last four miles of road is so very rough and in places narrow that one has to be keen to undertake such a trip. However, if one is able to come away with a nice handful of the beautiful and rather rare Maurea tigris, the trials of the journey are more than compensated for.

The writer has paid some six visits to this spot but only on two occasions was fortunate enough to find Maurea tigris, and it is possible that only for a short period of the year (perhaps three of four months) are they to be found; and it seems certain they are only there on very low tides: also they seem to favour a very restricted area.

The visits, made over a period of over four years, have been in the months of January, April, June, August, September and December, and the two occasions on which Maurea tigris were found were in June 1942 and August 1946; this last occasion the trip was made for the special purpose of collecting Maurea tigris and careful observations were made.

One would not rule out the possibility that they may be present at other times of the year; providing other conditions are favourable, such as very low tides, and absence of swell, this latter being necessary in order to make any observations possible.

The locality in which they were found is on the sheltered inner side of the Head where Mussels (Mytilus canaliculus) and sea-weed cover the rocks for a rather limited area, and the writer is inclined to think that the Maurea tigris may not regularly frequent the places from which they were collected.

Although found on very low tides, it would seem it is not that they are exposed to view as the water receeds, but rather it is likely that they sally forth from their usual haunts on a forage just after the tide has turned and begun to flow, and consequently are not exposed for any great length of time. The experience of other club members supports this belief.

On the last visit, having carefully searched the area mentioned at dead low water, only to find one lone specimen, the writer went away, returning in less than half an hour to find quite a few good specimens, all on the move; some among the mussels and sea-weed, but others quite clear in exposed positions above water level, and in places which had definitely been searched before.

Only a collector can imagine the thrill one gets on such an occasion as this.

A NATURALIST IN WARTIME EGYPT: F.G.SHORT

The following account of Egyptian Natural History is necessarily sketchy and deals only with those parts of Lower Egypt and the Northern Coast with which the writer became familiar during the War.

As everyone knows, Egypt is entirely desert except for the fertile Delta and the narrow irrigated portion of the Nile Valley. To this must be added the Faiyum Depression-an Oasis of great fertility. No part of the country is rich in animal life, but it comes as a surprise to find that the desert is often richer in all forms of wild life than the fertile valley. For instance, I was never able to find any land snails in the irrigated parts yet Helix desertorium is encountered in millions in the arid Western Desert. Many interesting species of reptiles and mammals are likewise absent from the Nile banks.

To the east of the Nile the desert is often completely devoid of life and shows all the signs of recent dessication. The Mokattam Hills just behind Cairo are really a steep limestone escarpment cut by deep gullies. At the bottom the surface is of dust and sand; at the top, rocky and strewn with flints. Not far south of here is the so called Petrified Forest where the ground for many acres is littered with silicified wood. Fossil oysters and heart urchins are common, but of living creatures there is scarcely any sign. One often finds shells of long dead H. desertorium but never any living specimens, and no vegetation. It seems that this region has dried up perceptably in quite recent times. Going back further it is well known that the Ancient Egyptians hunted lions and other big game here when the land appeared to have had a fauna comparable to that of present day Sudan.

Today the only creature one is likely to see is the raven, attracted no doubt by the hope of garbage. Here it is perhaps interesting to know that the Egyptian kite, which is the common scavenger of the towns and whose numbers must run into millions - never ventures far into the desert. In these eastern parts even though vegetation may be entirely absent, one may sometimes meet with the horned viper (Cerastes cornutus) of bellicose temperament, several varieties of lizards and perhaps a colony of jerboas (pretty little jumping mice), and I once had a large black lizard.- like reptile with a fat spikey tail. As vegetable matter can hardly play any part in the diet of these animals, one wonders what they find to live on. The soldiers theory that "all flesh is flies" seems to offer the most feasible explanation.

The only land snail I ever saw alive east of the Nile, was a reddish variety quite distinct from the common H. desertorium, and it occurred (as far as my observation went) only at the Small Arms Range some few miles out of Heliopolis on the road to Suez. Its occurrence here in this arid flinty region is unique, and from the desperate appearance of the scant vegetation I believe this pocket is also drying up and the snails doomed to extinction.

Two disappointments await the Naturalist in the Nile Valley. One is the absence of the sacred ibis, now apparently a rare bird in Lower Egypt. The other is the scarab which figures so largely in the Ancient inscriptions but is seen at only a few places in the Delta. It is much more common in Palestine. At certain times of the year flocks of lovely white egrets inhabit the irrigated fields, and the hoopoe is often seen among the trees on the river side. This last is a bright green rather prehistoric looking bird with a wide distribution. It has even been recorded in England, and is mentioned by White in his "Natural History of Selbourne".

The rugged hilly desert of the east ends at the Nile and towards the west the land is flat to undulating being mostly barren sand and clay pans. Little pockets of scrub occur which are able to maintain a small animal population.

But about the region of El Fuka on the coast, a limestone ridge rises a mile or two inland and coincidental with this is a remarkable increase in plant and animal life. The narrow plain between the ridge and the sea is barren and dusty, and H. desertorium is usually represented only by dead shells, but on the top of the escarpment the change is most remarkable. Here are large patches of scrub about three feet high, and often hundreds of acres in extent alternating with claypans and bare rock. The land slopes imperceptably southwards into the Great Sand Sea, become progressively more barren, but in the scrub area wild life is surprisingly rich and varied.

The desert snail is found in thousands, at times literally coating the bushes and rocks. The common form is thick shelled, rounded and opaquely white, but varieties occur and some forms are strongly keeled. As they are dependant upon the patches of vegetation, it follows that colonies must from time to time become isolated and new varieties arise.

Insect life is abundant and every flat stone shelters its quota of green scorpions of a small and relatively innocuous species. A small harmless snake is quite common, and the venomous species include the asp of ill repute, also a handsome green snake with a jet black cobra-like head which I know from personal experience, will not hesitate to attack when disturbed.

Many small rodents and the Egyptian hare and desert fox occur here. The last named is a fine looking animal with a silvery grey pelt. Gazelles are plentiful and the cheetah sparsely distributed. The sensational rumours one heard of lions in the Western Desert probably referred to this animal.

The coast itself proved disappointing. The writer was able to collect Janthina Sp on the beach at Maaten Bagush, but the water deepens very rapidly and there is only a poor littoral fauna. In the few places where there are rocks there is very little seaweed. One specie of Limpet, a few Murex Sp., and Latirus Sp., are the sole inhabitants of the sandy pools. I got the impression that the prevailing wind was from the south i.e. off shore, and would carry a heavy load of sand and dust which being constantly precipitated into the littoral zone, would have an adverse effect upon seaweed growth.

In concluding this brief account of the natural history of these parts, mention must be made of the enormous flocks of migrating birds which cross the coast here on their way south. I was unable to witness the return migration in the spring, but was here for two successive autumns and the wonderful flights of storks, cranes, geese and other birds was a sight no bird lover could ever forget.

THE SUTURE AS EVIDENCE FOR EVOLUTION IN AMMONOIDS: E.RICHARDSON

It has been claimed by an English worker on these interesting fossils, that the suture is not a feature to be used in any discussion on evolution in the class. He claims to have found ammonites showing both an advanced and a primitive (ceratitic) suture on the one shell. This claim has been recently substantiated in New Zealand by the find of Mr.H.Battey of the Auckland University. An ammonite was discovered at Kawhia showing both an advanced and a primitive suture.

POTOMOPYRGUS ANTIPODUM: E.RICHARDSON

At Oue in the Hokianga Harbour, on mud-flats near the Whirinaki creek both the above and the marine pulmonate Amphibola crenata (Martyn) live together.

At Putiki, Waiheke Island, Ophicardelus costellaris and P. antepodum both live amongst Leptocarpus simplex on the upper reaches of the mud-flat. P. antepodum is a well known fresh water snail of New Zealand.

POTOMOPYRGUS ANTIPODUM ZELANDIAE (GRAY) E.RICHARDSON

This small well known fresh water snail has been found to be a carrier of the destructive liver fluke. Although the incidence of this pest is not great in New Zealand it has been recorded in Hawkes Bay where the snail occurs commonly in all streams. Farmers have found that by tipping quantities of bluestone into the creeks, the snails are destroyed but most farmers also take the precaution of having their sheep inoculated.

GREAT BARRIER ISLAND: M.HOLLOWAY

A glance at the map shows how this long island and the Little Barrier form a barrier between Cape Colville and the mainland and give us the great Hauraki Gulf.

Great Barrier Island is roughly 25 miles long and 12 miles wide at widest part near Port Fitzroy, where it rises to a height of 2,000 feet on Mt.Hobson.

The west coast is very rugged, with bush clad cliffs and deep water and deep inlets providing good anchorage for ships, in fact Port Abercrombie, on which the settlement of Port Fitzroy is situated, could shelter a fleet. The east coast is quite different, with open rolling country, long sweeping white beaches and very picturesque rocky headlands and islands.

My friend and I, had a night trip down on the grimy little cargo boat which is the only means of transport for settlers and visitors. It does not cater for passengers, so we were agreeably surprised to find that, by our early reservations we were allotted two of the four bunks in the tiny saloon where the crew came and went all night for cups of tea!, whereas the remainder of the passengers slept - or tried to - on the floor of the hold.

We left Auckland at 10 p.m. and were steaming into Port Abercrombie at 6 a.m. on a lovely March morning, with the still deep waters of the harbour like a mirror. After unloading goods at Port Fitzroy we started on the delightful trip down the coast, with halts at Whangapara and Okupu to deliver supplies, and finally disembarked at the last port, Tryphena, at 10 a.m.

There was only one guest house open on the Island, so our host was there with his lorry to meet us and a few other guests and transport us across the range to pretty Oruawharo.

We loaded ourselves and our luggage on to the lorry with the cases and sacks of provisions for the settlers en route. An old car seat backed against the cab of the lorry was quite inadequate and some of us sat on the sacks for the rough, jolty journey, however, what we lacked in comfort was amply made up for as we crossed the central range and could see as we looked back over Tryphena harbour, Cape Colville, and many islands in the Gulf.

From the summit we looked North over Oruawharo with its green farmlands, sweeping white beaches, rocky headlands and islands, right up the coast to Mt.Hobson.

Our homestead was set on a hill some distance back from the beach, so, every visit to the beach meant a hike across paddocks and sandhills to a pretty little land mark island - at high tide - half way along this long beach.

The best collecting region was on the headland at the south end of the beach - a full half hours walk from home. It was similar to these on the mainland with its rocky platform, deep pools and large boulders. Unfortunately, the tides were the poorest in the month, because, as my friend's companion had been unable to go and I took her place, the reservations had been made by non collectors with no thought of tides.

All along this area the water was very clear, and I could see the possibilities in the kelp covered rocks which were tantalizingly out of reach. I am sure dozens of species were there to be added to the 60 or so I collected, mostly the same as those on the mainland. I have many other species, including Maurea Osbornei, Maurea tigris, Pallium convexum, Xenophalium labiatum, Tonna haurakiensis and Xenophara neozelanica, also numerous minute species from dredgings made by the late Mr.W. La Roche.

As well as Marine collecting, there is plenty to be found up the streams and in the bush, especially the stream and valley at the south end of the beach. Here at the mouth is Amphibola crenata, further up are Melanopsis, Latia and Potomopyrgus and still further up, an outcrop of volcanic tuff, which can be split into thin sheets revealing imprints of leaves and fresh water mussels.

In the same valley are to be found strewn over the slopes, boulders of petrified wood, with enough pieces of portable size to make the pack very heavy.

The island is an interesting place for geologists too, and the samples of stones and rocks left on the sandhills by the Maoris or found in the stream beds, bear this out. Incidentally quite a lot of Maori curios are found from time to time on these sandhills.

Botanically it is full of interest and quite a number of rare plants are listed from there.

Not much has been done around Mt.Hobson with its dense bush clad slopes and I feel sure quite valuable additions to our land shell lists and plants too, remain to be discovered. I know Paryphanta busbyi and Placostylus have been found and must still be there.

The distances are great and with limited time on a brief holiday, few areas can be seriously explored. For instance, the few species I collected while waiting for the boat at Tryphena on the return home, prove that area to be well worth a longer visit.

I said - "Waiting for the boat!" We left Oruawharo at 5 a.m. and jolted over to Tryphena, expecting to catch the boat at 6 a.m. We knew it had left Tauranga, so dared not go far afield in case it appeared around the point any minute. It rained so we sheltered in the wharf shed, the tide receded and I made several attempts to do some collecting minus all my collecting gear which was packed. The tide came in and still we waited! At 6 p.m. the boat appeared around the point and went to the wharf across the bay and sent word that she would sail at 6 a.m. tomorrow.

We selected enough luggage for the night, climbed on to the lorry which with less cargo, bounced more and went home for the night only to start off again at 5 a.m.

Another breakdown on the way up the coast with a close shave of drifting on to the rocks, ending in a tow into Fitzroy for minor repairs brought our adventures to a close and we finally reached Auckland at 9 p.m.

Even with these transport annoyances, the Barrier is well worth the trip and everyone that visits it, wants to go back.

WARTIME COLLECTING IN THE TREASURY GROUP: N.W.GARDNER

While serving with the Armed Forces in the Pacific I spent some time on these islands. Though collecting was very good, it was very difficult getting specimens back to New Zealand. By dumping some army clothing I managed to bring back some three hundred of the smaller varieties. Literature on this area being hard to acquire, this description will not be very detailed.

The group is seven degrees south of the equator and comprises the Islands Mona, Stirling, Watson and Wilson. The latter two are very small, less than a quarter of a mile across. Mona is by far the largest, being seven miles across and the highest peak six hundred feet above sea-level. It is clad in a dense jungle right down to the shore. The coastline is mostly jagged coral cliffs, the only decent beach being on the south side. This extends for nearly two miles and is broken into zones - a stretch of white coral sand at Falimai native village, followed by an area of small boulders - the mouth of a tidal creek, then massive rocks giving way to steep cliffs.

Off-shore from this area lies crescent shaped Stirling, an aged reef some two miles long and three hundred yards wide. Most of this island is covered with coconut palms. Owing to the absence of fresh water the natives do not live on it, but visit it at times to collect the nuts for copra.

Shell collecting in the sheltered water between Mona and Stirling was always very good. The tides were slight and by wading waist deep and feeling in the crevices of rocks one could work over an area never uncovered at any time. In this way very nice specimens of Conus textile, Turbo petholatus and Harpa gracilis could be obtained. Thais persica, another fine shell was collected at times. In about eighteen inches of water two kinds of cowries were to be found - Cyprea mauritiana and C.arabica. A small white Trivia was very plentiful amongst stones.

The sandy beach offered Oliva irisans and several others of the same family. An occasional "Silver lip" (Strombus lentiginosus) came to light but not often. On the cliffs a few of the more hardy kinds existed - a pagoda shaped Tectarius and a pink Littorina predominated.

On Stirling, by diving in six to eight feet of water three Trochoids could be gathered from the bottom. The largest of these was the commercial Trochus niloticus. Mushroom corals Fungia patella were very common here, their colour being the same as the under side of a real mushroom. Medium sized specimens of the giant clam were to be seen in fairly shallow water, the blue or purple mantle making them easy to see from the surface.

The small streams were rich in specimens too, even well inland. This was the home of the limpet like Septaria, while nearer the coast in sluggish pools the typical Solomon Islander Neritina corona thrived - a rather handsome shell, round and spiny. Some of this family favoured the tall reeds along the creek banks.

In the jungle quite a number of land snails existed, the largest being the two and half inch Placostylus founaki. (Hermit crabs found these shells very comfortable for their soft tails and invaded some distance inland in search of them). The leaf mould offered a variety of Leptopoma, Pupina and Diplomattina. Realia was also represented by a species somewhat similar to our Liarea egea.

WAIKATO RIVER COLLECTING: F.W.SHORT

In 1942-43 while stationed at Hopu Hopu near Ngaruawahia and camped on the bank of Waikato River I had ample opportunity to study the Mollusc life there.

Large numbers of Hyridella, Isidora, Potomopyrgus and Sphaerium were available. Having a Sergeant who was fond of a daily dip in the river I enlisted his support. His technique for the fresh water mussels was to locate them with his feet and on lifting them bring the best specimens to me. While I believe them all to be Hyridella lutulentus they vary considerably in form.

I usually cleaned the specimens at once with the aid of a razor blade and throwing the animals into a shallow portion of the river it was only a matter of moments before eels came on the scene. They seized the mussel with their mouth and with a shake of the head made off to deeper water.

One day I found a single valve of a Sphaerium and later a complete specimen. I did not know at the time what they were and hunted for more. Eventually I discovered they were there in quantity in the mud and particularly among willow roots.

Potomopyrgus and Isidora could be collected in quantity.

OYSTER BEDS: E.N.HOUGHTON

In spite of the hazardous life led by the rock oyster, from the egg to the stage when it finds its way to a suitable permanent abode, the Northern tidal rocks are usually found well covered with these molluscs.

Smooth rocks are put down in some places, along the sides of sheltered bays where conditions for the culture of oysters are good. It is perhaps not realised how much time and trouble must be taken in order to keep the oyster beds free from pests.

First there are the two varieties of small borers, Lepsiella scobina and L.scobina albomarginata, which secrete sulphuric acid onto a spot on the oyster shell and very soon make a neat hole through which the flesh can be devoured. Although Maoris are paid by count for collecting large numbers of these borers each year, little consideration seems to be taken of the fact that much greater dividends would be obtained by collecting the shells just before spawning time. In the Bay of Islands these shellfish and the larger allied species have been observed in September, laying their many eggs on the sides of rocks in fairly sheltered spots at half tide.

The two much larger shellfish of the same family are Lepsia haustrum and Neothais scalaris which grow to three and a half or more inches in length and play havoc with oysters in some places. A whole bed has been known to be destroyed in a short time by these voracious marauders. Their method of attack is to exert pressure, with a powerful foot, on the valves of their prey in such a way that the adductor muscle can no longer hold and the shell is forced open enough to allow the radula to enter.

Lepsia haustrum is not averse to making a meal of the nearest Lepsiella, should the oysters in the vicinity not prove to its liking.

Barnacles and the sea-weed Hormosira Banksii cause much trouble by smothering the oyster beds and some time each year is spent in kelping them reasonably clear.

The small mussel Modiolus neozelanicus is also a nuisance in this respect, covering the oysters or, as they grow, forcing their way under the large shells. When the mussels die, their shells break up thus causing the oysters above to become detached and swept away.

Last but by no means least is the picnic party who cannot resist taking oysters from the rocks. Here the crime is not so much the taking of the oysters, but in the fact that, when the shell is prised open with a knife and the fish removed, one valve remains cemented to the rock and forms a rough surface which is unsuitable for recolonization of the oysters.

Having all these destructive agents with which to contend, we can understand the necessity of keeping a watchful eye on the welfare of one of our most prized delicacies.

NATURE NOTES FROM THE SOUTH ISLAND: MRS.M.MOUAT

To be a shell collector you have to go to all manner of queer places. To gather sea shells, you watch for the lowest tides, wade across a neck of water to reach an uncovered reef, crawl under overhanging ledges, where so many of our rare specimens hide, turn over rocks, often at the expense of skin, and watch the sand as the tide turns to see shells that have buried themselves out of sight, emerge.

To gather small land shells you seek the damp places in bush; the damper the better.

The greatest thrill of all is to hunt for our largest land shells which for the most part, live in primeval bush far from the haunts of man. Paryphanta traversi, found at Levin, is very little above sea level and I found P.gilliesi subfusca alive on the bank of a tidal creek in N.W. Nelson but our largest and most beautiful snails are only to be found high up close to the snow line at anything from 2000ft. upwards. Paryphanta superba lies snugly hidden under clumps of snow grass, probably most of the winter. The strangest thing about these shells is that they are invariably found on limestone.

Paryphanta compta, a much smaller variety is found a few miles from superba but swift streams and deep gorges lie between. This variety is found at The Castles, so named from the wonderful limestone formations of the cliffs on the Rocky River side which resemble giant castles. Its on top of these cliffs on a sloping terrace that we found compta. It is covered with bush and the usual undergrowth but across the terrace are deep crevasses some wide and some narrow. Across these cracks one has to leap and hope the ground on the other side will not give way.

It was on this terrace we saw many marks of deer. A circle like a circus ring, where probably two stags fought while the doe circled around. Its a wild but wonderful place. High up above is the Brown Cow a schist mountain across which diggers carried provisions and camp gear to the upper reaches of the Slate River. There is a large Paryphanta up there to be found by a venturous collector. An eight hour tramp and with a load on ones back makes it a very hazardous trip, although at an early gold rush women were known to be there with their husbands.

To the weird and wonderful limestone formations 2000ft. up on Mr.Burnett, the climb is stiff but a good track takes you to the coal mine 2/3 rds. of the way. This Mountain is a geologists paradise.

At the foot, dolomite, a magnesium carbonate of lime is worked; higher up there is the pink marble; still higher up the coal mine, then the stiff climb to the top where among the queer rocks you find P.gilliesi.

The first time we went up we found very few, but a year later we gathered over 300, only about a dozen alive. One wonders why there were so many dead. The view from the top is wonderful, the Tasman sea stretches away to the west and Cook Strait lies to the east with Mt.Egmont away to the North. I must not forget the beautiful sky blue Toad-stools which we found on that wonderful mountain. At the side of an unthinkably steep track in that district I found most beautiful purple mushroom-like toad-stools while reds and yellows were quite plentiful.

To get to the habitat of P.fallax is easy for you can use the track used by the men at the iron works at Onekaka, 7 miles from Takaka. In depressions like extinct craters above the iron deposits we found the beautiful little tartan fallax but further back along the ridge they seem to have lost the green

tint and are mostly brown.

The Tableland near Mt.Arthur will probably provide several new varieties to add to our ever growing list.

COLLECTING ALCITHOE ARABICA ON CHELTENHAM BEACH: MRS.M.E.McKELLOW

For a good collecting spot, easily access to Auckland City, I give Cheltenham first place.

It is pleasant and clean and although other places, Takapuna and Narrow Neck reef for instance, seem to have become worked out, Cheltenham remains consistent. There, the very beautifully marked volute Alcithoe arabica, may still be found as abundantly as ever.

I have long made a practice of taking only the perfect specimens with nice markings and sound lip, but on the few occasions when I have been tempted to take thin lipped ones, they have been broken by the time I reached home.

There are many old corroded arabicas about, and I think they stay in the one vicinity for long periods. One, in particular, I have been watching for at least 18 months and never fail to find it within a 6 yard radius of its original spot. I may mention that I always put it back near a rock, where I first found it. Another conclusion I have come to over the years is, that it is only when the tide is almost on the turn that the Alcithoe arabica becomes visible. In my early collecting days, I have wandered at low tide, over a stretch of sand and finally giving up hope of getting any shells, decided to leave, then changed my mind and gone back over the same ground. Then I would find quite a number of lovely specimens. They make a hump in the sandy mud and are quite easily seen once they come to the surface.

These shells are widely distributed over the sand flat and may be found from North Head to the Narrow Neck end of the beach.

I will not readily forget one collecting day during the war period shortly after the Japanese entered the war, I was standing on a rock at the water's edge watching to see if the tide had turned, when suddenly there was a sound of machine gun fire and a spatter of bullets hit the water a few yards ahead of me! Believe me I nearly jumped into the sea. The explanation was in the evening paper - they were firing at a launch which was cruising about and had disregarded the signals.

NOTES ON MOUNTING RADULAE: E.S.RICHARDSON

The material should, whenever possible be fresh and alive. The technique varies for small material, but generally the following method should give good results.

Narcotization is best done with 1% alcohol solution in which the animal will die expanded. To extract the radula cut with a razor blade or scalpel, from the mouth back along the top of the head. Cut lightly so as to uncover only the roof of the mouth and the radula may then be easily lifted out with tweezers.

The radula is not ready for mounting until the animal matter has been cleared from the horny teeth. Small molluscs can be decapitated for the clearing stage. The head or radula is put into 10% caustic soda and boiled over a spirit lamp until the radula is clean. Such vessels as evaporating dishes or watch glasses can be used. In the case of a microscopic shell it might be found beneficial to clean the radula on a slide. The radula is then thoroughly washed in water to remove all excess soda. The staining process takes two hours. One of the best stains is Picric acid (aqueous) and the radula will stain a deep yellow to orange. Dehydration for mounting can be quickly done by passing through the strengths 40, 80, 95% picric/alcohol. The alcohol is slightly coloured with picric acid.

From 95% alcohol the radula may be cleaned in clove oil (again tinted with picric acid) and then mounted in Canada Balsam.

This technique has the disadvantage of being slow, but the advantage of giving a permanent result.

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AUCKLAND MUSEUM CONCHOLOGY CLUB

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BULLETIN No. 3.

AUCKLAND, NEW ZEALAND

AUCKLAND MUSEUM CONCHOLOGY CLUB

BULLETIN NO. 3.

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PREFACE

Once again the committee has much pleasure in presenting the Club Bulletin in the form of articles written by members from many parts of New Zealand.

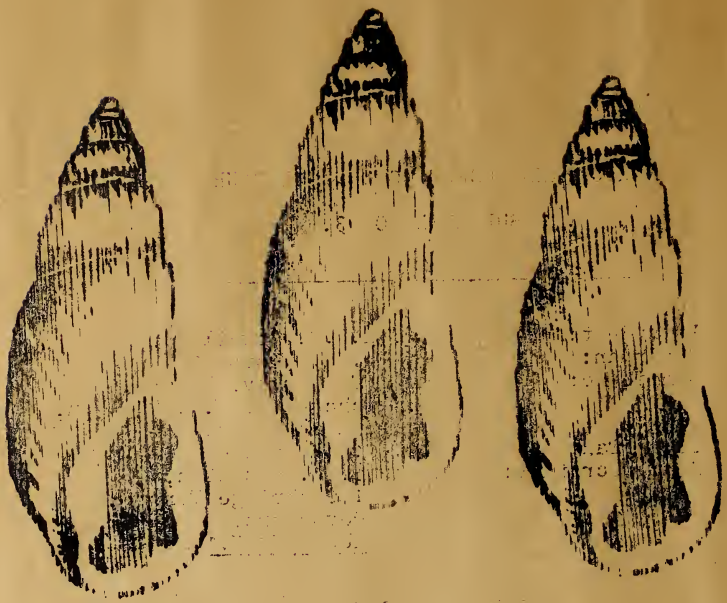
Our membership is increasing, and now stands at 55 members, all of whom are very enthusiastic collectors.

Printing difficulties are still a great handicap, but through the good nature of several people a cyclo-styled publication has been done.

Our thanks are due to Mr. A.W.B. Powell, who checked the articles, to Mr. N. Gardner for his good work in cutting the stencils, and to Mrs. G. Flynn and Mr. F. W. Short, who published the bulletin.

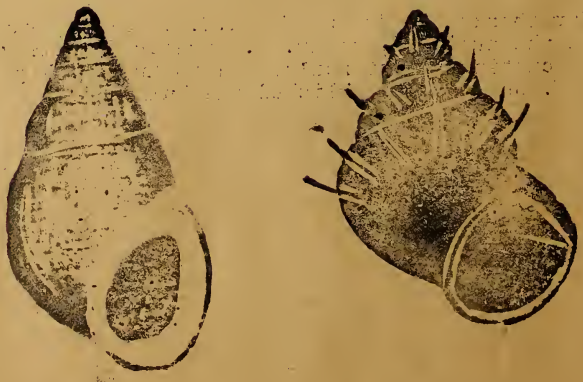
E. N. Houghton,
Hon. Secretary.

December, 1947.



Placostylus ambagiosus priscus, Powell

The shells of this subrecent snail are to be found scattered over the sand dunes at Cape Maria Van Diemen N.Z.



Prludestrinidae.

In nearly all our streams there are numbers of this family. They are small, mostly about ¼ inch.
Illustrated are Potamopyrgus antipodum and the spiny species P. corolla..

A TRIP TO D'URVILLE ISLAND, COOK STRAIT

D'Urville Island is rather an awkward place on which to land. If you leave Wellington the boat arrives at the French Pass about 3.30 a.m.; if from Nelson, well, it is round about 11.30 p.m. Certain tides the boats go through the French Pass; other tides on the outside of the island, which is about 20 miles long, if I remember rightly, and seven miles wide at its widest part. It seemed to me to be mostly bush. My friend and I booked our passage for the round trip in the mail launch, and we were down on the beach all ready before 6 a.m., but the mail man overslept and left us waiting, much to my disgust. However, I left Nelson in very high spirits about 7.30 p.m., but they were down to zero when the boat stopped at French Pass at about 12 p.m., and I found I had to climb down a rope ladder over the side of the boat on to the mail launch. I hung back until nearly all the passengers were over, watching how the trick was done; landed all right, and then found I had to scramble aboard my friend's launch alongside - and I'm not very brave jumping about on small boats, especially on a dark, rough night.

It was half an hour's run to Ohana Bay, then into a small dinghy and pulled ashore - took too short a jump and landed in the water. Half a mile up to the house, and not being a good navigator at night, I kept stumbling off the track and into the bank. Thought to myself, never again - but I did.

However, once we reached the house everything was all right and I had a royal time, although I was never very happy changing from dinghy to launch, and one has to travel by launch in order to get anywhere. Once while changing over the launch rolled and I nearly went overboard, and everybody got a fright.

From Ohana Bay all the little beaches as far as the Pass made good hunting, but the outside of that end of the island was not too good. The two sons of the house, aged 12 and 13, who were great helpers at first, soon became keen rivals and used to be out of the dinghy and along the beaches before I had a chance. At Ohana Bay I found lots of Astraea heliotropium, both large and small, including a few live specimens. One evening going out to the tank stand where I kept my shells I saw what I thought were three glow worms, but found the lights came from some points of an Astraea, so took a pin and cleared the other points, and had each one giving out a light. Poirieria zelandica, empty shells, are also very plentiful, which I thought wonderful until my friends brought up some while fishing - tiny ones about ½ inch to full size, all alive. On my travels I told a shell collector I would send him a proper specimen when I opened up my shells, and he seemed very sceptical about any being better than his. However, he wrote and said he was thrilled and had never thought they could be so beautiful and perfect.

Another thrill was finding Maurea tigris and I came away with more than I ever expected to see in a lifetime. They were in a bay nearer the Pass and at the same place were lots of Modelia granosa, large and small, some tiny ones being alive. As for Maurea punctulata - a fisherman bet us £1 we couldn't collect a thousand shells, but we did, and left thousands behind. I was also amazed at the size and length of the barnacles which at low tide reminded me of a rock garden, and I noticed them right across the reef that juts out into the Pass.

When out fishing it was always a race between the boys and me to feel which fish had the pretty Limatula maoria in their stomachs, along with the frail pink cockles Nemocardium pulchellum or perhaps Pallium convexus.

Before I arrived one of the boys found two Soluzea spiralis at Ohana Bay, but not knowing the value of them broke one up! When I came back to the island later, he kindly gave me the good C. spiralis. I didn't like taking it, but he has since found another. Once a fleet of Nautilus shells went ashore there, but the children broke them up. A lady I visited had 15 of all sizes that she salvaged from the fleet. Nautilus sometimes go ashore at the end nearest Wellington, and the Italian fishermen collect them. One came my way thanks to a fisherman friend.

The beaches on the mainland opposite didn't have very much, mostly limpets, but at French Pass beach I found a sea horse and a Maurea pellucida. Ohana Bay has lots of Cantharidus opalus, C. purpuratus, Micrelenchus dilatatus, Paratrophon stangeri, Zeatrophon ambiguus, Monia zelandica, Cardita aoteana, Atalacmea fragilis, Notoacmea parviconoidea, and a few Alcithoe and lots of tiny shells, also Haliotis iris and virginea. I was too far away from the mountain to go after bush snails - it was shearing time and the boys couldn't be spared. One day we went to a bay on the outside of the island to get some Poireiria zelandica, and also to go to some small islands which were all rock. Some had tuatara lizards, and one had a tunnel which we were going to go through. However, the ocean became very rough, so we just had to pass the islands by, but we had good hunting and found beautiful specimens of Poireiria at the bay.

On the way home there was a real storm. It was a large launch, but it bobbed up and down those waves like a cork. We were going through the passage between the islands and D'Urville when the tow line of the dinghy broke, and then there was excitement until it was captured; but the launch going round and round after that dinghy proved to be my undoing - no, I wouldn't part with those Poireiria zelandica; I suffered too much in bringing them home.

The night I left D'Urville Island was very dark and rough. It was uncanny to be sitting out in a boat in the pitch dark and to see lights gliding along from all directions, waiting for the steamer. Then up you scramble from your pitching launch onto the mail launch bobbing up and down beside the ship, make a grab for the ladder and find two seamen waiting at the top to haul you aboard. Of course it wouldn't be so bad in daylight - however, I'd risk it again, and now that I know more about shell collecting, thanks to the Conchology Club members, I'd make up for past deficiencies. As it was, I found over fifty varieties of shell fish.

M. E. WILSON

SOME MOUNT MAUNGANUI NUDIBRANCHS

APRIL TO SEPTEMBER, 1947

To study these beautiful creatures properly some kind of aquarium is essential and to add to their comfort and make a suitable setting a few anemones of brilliant colour helps a lot.

If a lens is necessary when making a correct sketch, the subject can easily be placed in a shallow glass dish of salt water and transferred to the most convenient spot. Between 22nd April and 13th August, when hunting was on, fourteen varieties were collected between the Harbour Beacon and the Mount wharf. Before this a large Tethys tryoni had been found on 28th February stranded just above low tide mark on the beach; it only lived for seven hours, but showed considerable activity enabling some fairly correct sketches to be made. The shell was not extracted before the animal was placed in spirit, as several empty shells had been previously found, and one dead animal with the shell attached; all of these were much smaller than the live specimen.

Some of the slugs found were fairly plentiful, others extremely rare. They all seem to have their seasons; take Rostanga rubicunda as an example. The first specimen did not appear till 13th August and then they were found in great numbers for a few weeks before vanishing again. Necromantes incerta was common during April and May, rare in June and July, absent in August and September. Others always more or less common during this period are Glossodoris aureomarginata and Pleurobranchaea novaezelandiae. Four different varieties have spawned in the aquarium.

For the information of anyone who may be interested, here is a list of slugs so far collected, studied and sketched, which are not mentioned in these notes: Bouvieria ornata, Bouvieria aurantiaca, Archidoris wellingtonensis, Stenodoris flabellifera, Alloiodoris lanuginata, Atagema carinata, Ceratosma amoena, Aphelodoris luctuosa, Dendrodoris citrina.

It would be tedious to describe more than one member in detail, so let Aglaja cylindrica suffice. He, she or it was found crawling in shallow water on sand at dead low tide on 20th May, 1947.

A very beautiful little fellow, jet black, blue black in some lights, very active and friendly, and knows how to take hard knocks when they come, i.e. on one occasion she? was sucked up through the siphon used for emptying the aquarium and thrown out with the waste water; ten minutes later when absence was noticed she was recovered, a trifle discoloured perhaps but still Aglaja and as bright as a bullfinch.

The length of this one was 39 m.m., width 10 mm. The mantle is divided by a slash across the middle of the back, but the division is only clearly visible when the back is hunched.

At the rear of the division the mantle seems to adhere to the body, but the other side can be flapped forward slightly, over the back, exposing the white body. The up-turned lobes at the sides of the body appear to be part of the mantle normally, but they can be opened slightly at the posterior end and are more or less free anteriorly; this was only discovered when the animal was spawning.

Spawning began at midday on 24th July and was all over in an hour. The patient had to be gently moved with a soft paint brush so as to present a clear view of the operation. This caused no disturbance; spawning continued all the time till it was over and she slowly slid away, leaving what looked like a badly tangled fishing line or a hair net that had been through the box broom.

With the aid of a lens spawn in the form of minute white eggs strung closely on a single thread could be seen issuing from under the mantle at right, posterior end, and sketches were made. The position of the body during spawning was hunched up, fore end being turned slightly to the right. The animal showed no trace of distress either during or after the operation and continued as active as ever.

All other slugs that have been through the aquarium, with the exception of Tethys tryoni, have the habit of floating foot uppermost on the surface of the water but Aglaja never; she burrows into the sand on the floor of the aquarium until completely hidden.

On 24th August she died, thirteen weeks and five days after capture; the shell was extracted, small and fragile but perfect, measuring 6.5 mm. x 5.5 mm. Though not common several other specimens were seen in August.

A word of warning to slug hunters. There is a catch for beginners other than falling in and getting wet or barking ones shins on rocks.

On the afternoon of 7th July, when the tide was at its lowest and the water was still and clear, a new slug was discovered crawling on sand in the company of a Notoplax mariae Chiton, a very beautiful fellow, fit company for any slug.

They were both placed in the collecting billy together, with other specimens to be examined at leisure in the aquarium. This is where the headache began. Here was a Nudibranch with no visible gills, only one rhinophore and a large head with stout tentacles, prominent eyes and large mouth. The animal was well extended when moving, with head and tail produced well beyond the mantle and it was a fairly fast mover. When resting it was almost circular, completely covered by mantle, back hunched up looking like a pale yellow haycock with knobs on it. Here was a stumper. "Suter" (I am sure he would have smiled) was studied into the small hours several times, but no Nudibranch was found to fit. Sketches were made and a description written in the log book. This animal also had the habit of floating on the surface, which helped to tighten the trap. The creature was a fair size as slugs go, being 53 mm. long, 33 mm. wide and 25 mm. high; measurements were taken when the animal was crawling; it lived for four days and was then placed in spirit still unidentified. An internal shell could be felt, but the temptation to mutilate the specimen and extract the shell was resisted.

Revelation: On 4th July another similar animal was found at the same spot only stranded on the high tide line; it was a smaller specimen and it also lived four days and at midnight when death was discovered, the shell was extracted and identification was simple . . Lamellaria ophione. The shell was perfect and very beautiful, not unlike a piece of iridescent glass with a pale blue tinge; it measured: height 19 mm., width 13 mm. - A calm and beautiful baby sleep followed.

GORDON WILLIAMS

COLLECTING SHELLS ON STEWART ISLAND

A trip round to the north end of Horseshoe Bay, on the 10th November, resulted in an interesting haul of shells. A very useful friend to collectors of shells, plants, seeds or bugs, Miss Olive Allan, had been round there the afternoon before, and brought her findings in for me to have a look at, and, to our great excitement, a number of what appeared at first sight to be Neoguraleus sinclairi, not uncommon here, turned out to be very like a shell which Mr. E. S. Richardson had identified for me a few weeks earlier as N. murdochi. As neither of us had found this for ourselves here on the Island, we rode round next day to look for more, reaching there just about low tide. We concentrated on the swathes of Stiracolpus symmetricus which extended from about half to low-tide mark. Here were numerous Xymene plebejus, thinner, darker and more perfect than those we find on other beaches, Zethalia zelandica, live Taras globus, Micrelenchus of several species, young Paphirus larghillierti, bright coloured Tawera spissa, particularly beautiful little Zeatrophon ambiguus, Maoricolpus rosea, Tanea zelandica, Cantharidus opalus, Myadora striata and others. And from among them, with our noses pretty well to the sand, we sorted out several dozen N. murdochi, some Perrierina taxadonta, an Emarginula striatula or two, a Mitrithara gemmata, a Liracraea epentroma, a few Trochus viridus, a few Paxula, a Trochus tiaratus, three Micrelenchus of a species new to us, and a Zeatrophon pulcherrimus. Several shells, obviously Trophons, which looked strange to us, are apparently a very pale form of Axymene turbator; I have found these buff coloured ones alive under the Halfmoon Bay rocks. A little further on, in the corner of the bay, were dozens of Alcithoe swainsoni, most of the large ones with the pattern worn off and the surface roughened. And I may mention here that the smell of A. swainsoni, recently alive, outsmells any other shell that I know of!

On the dry sand above high tide there was an odd valve or two of Offadesma angasi, and bleached Struthiolaria papulosa var. gigas. A hurried look among the rocks by the little wharf resulted in the largest specimens of Margarella turneri we have found, and some Atalacmaea fragilis; very large N. subtilis and Axymene turbator.

Walking back, along the mile of smooth, hard sand, at first there were odd live Modelia granosa, S. gigas, a Maurea punctulata urbanior (damaged), and some bright Gari lineolata. It was here that Miss Allan had picked up, the day before, a large, heavy Bassina yatei - very rare here. Then for a long stretch there was nothing but Amphidesma australe, and the sea gulls flying up in the air with them and dropping them on the hard sand again and again till they broke - the fate, I may add, of practically every Offadesma angasi that comes ashore.

When we reached the south end of the bay, there were, as usual, large numbers of S. gigas in the corner, some alive. From the low tide rocks here, Miss Allan brought me, a while ago, some heavy, very broad Buccinulum marwicki stewartianum, a few showing signs of coloured lines on the outer lip, suggesting, to an untrained mind, hybridization with B. littorinoides or B. flavescens, which are also found here.

The uncovered rocks called us, but it was late in the evening, and we had a long way to go, so we hurriedly picked up a few S. gigas, and went home.

E.R.A. SMITH

RINGARINGA - STEWART ISLAND

A good half hour's walk along the southern shore of Halfmoon Bay brings the collector to Ringaringa Beach, a well known hunting spot. The coastline here runs to the south in a series of small, sandy bays separated by low, rock-strewn points. At the far end of Ringaringa is a small rock island with vegetation capping it. This, and the many others about the Stewart Island coast, are called "Nuggets". The coastline at the northern end of the beach is much more rocky, and from the top of the hill leading down to Ringa, the clear water with giant kelp (Durvillea subtilis) fringing the rocks, makes a very pleasing picture.

Among the rocks, just above high tide mark, Marinula striata can be picked up fairly commonly. The general shape and colour is much like our northern M. filholi found among Salicornia australis and rocks e.g. Rangitoto. Among the stones a little further down, the subspecies Anisodiloma lugubris lenior is found in place of the typical species which occurs in the north. Large specimens of Zediloma atrovirens are common in places, and if the collector is lucky, a bright green one may turn up.

About the splash line on larger granite blocks, Notoacmaea pileopsis sturnus occurs with very fine specimens of Melahaphe cincta. In one spot a few Kergulenella stewartiana may be found, but this interesting little mollusc seems to thrive best among seaweed, on rocks about half-tide mark, e.g. Akers Point.

The common limpet found between tides is Cellana rediminiculum - particularly well coloured when living in shaded places between large rocks. C. radians found so commonly in the north occurs occasionally at Stewart Island, and so does C. ornata, but many seem to be narrower, and have the apex nearer the posterior end than the usual northern specimens. Benhamina obliquata and Siphonaria zelandica are found in this locality too.

Under the very plentiful Modiolus neozelandicus and associated small moss-like seaweed, Placamium, are large numbers of the little pinkish bivalve Lasaea hinemoa. In the same community Risselopsis varia is common, not only in crevices, but out on the bare rock faces, together with well marked large specimens of Notoacmaea parviconoidea. The usual small oyster borers occur, but the common Thais is L. lacunosus, which may be found often among beds of the larger blue mussel, Mytilus planulatus. Here and there an odd yellow form of Mytilus occurs. Near low tide mark on many of the rock faces, dozens of Patelloida corticata corallina and P. corticata may be found. A small dark chiton found on seaweed about half tide was Sypharochiton torri.

On seaweed in small rock pools Micrelenchus tenebrosus is quite common, but Margarella turneri, which is easy to find in seaweed and under stones at low tide in some places e.g. "The Neck", and Halfmoon Bay, seems to be scarce at Ringaringa.

Bordering the rocks at low tide are masses of the large bull kelp, and under the holdfasts the beautifully coloured Margarella decepta may be found in fair numbers - but a tomahawk, a straight eye and plenty of energy are necessary for the job of dislodging the kelp. Good clean specimens of Buccinulum littorinoides and Onithochiton opiniosus are also found under the holdfasts, while the broader, colourful O. neglectus, together with Ischnochiton

circumvallatus and Zeuplicus live under stones.

B. littorinoides and B. flavescens with perhaps an occasional B. parnicki stewartiana, often occur half buried in sand beside or under rocks. Sometimes pauas, Thoristella chathamensis dunedinensis, and on rare occasions Chlamys gelator, Terebratella sanguinea, or an odd Turali stewartiana may be found.

On the sand flat the only living mollusc seems to be Dominella rissoides, and one or two Amphidesma forsterianum.

This beach after a good storm has yielded many fine shells, but for some months up to November 1947 very little had been washed up, and our only finds were one or two C. gelator embedded in sponge, one living Tanea zelandica attached to seaweed, a few Emarginula striatula, a large Terebratella sanguinea, several Struthiolaria papulosa gigas, Amphidesma forsterianum, large Protothaca crassicostata and numbers of Aulacomya maoriana caught among the tangled 'roots' of a large seaweed.

E. N. HOUGHTON

BRIEF NOTE ON HAUREA PUNCTULATA

In March, 1947, in company with Mr. K. Thompson, I was hunting for shells along the East Coast of the Coromandel Peninsula. The hunting at this time was very poor and most of the less common gastropods seemed to have taken to the deep water. This was the case as far as our observation went all the way from Whangamata to Mercury Bay. The occurrence therefore of Haurea punctulata in large numbers at a spot just outside the entrance of Tairua Harbour was all the more remarkable.

Here was a typical sandy ocean beach with rocks at each end. At the north end, owing perhaps to some vagary of the tide, the sand was rapidly encroaching upon the rocks and the Haurea were to be seen in dozens high up out of the water where they were evidently trying to escape the sand. Others were found buried in the sand and two very juvenile Cantharidus opalus with them. This was the only time on the whole trip that either of these species was found.

F. G. SHORT

TIDES...

Where is the highest tide in the world and what is its range?

The Bay of Fundy, Nova Scotia. It has a mean range of 42 feet and a spring range of 45 feet.
) From A.A. Bulletin. March 1948.

(Incidently the smallest mean range is found at Venice, where it is ¼ inch.)

Arthur Richardson.

SHELL COLLECTING - THRILLS AND SPILLS

In my collection is the first shell I brought home. I found it alive at Weymouth in 1894 - Cabestana spengleri, and for years it was a lonely specimen. In 1908 a school master gave me a collection of shells which was of no further use to him. I was proud of these shells, and later added a few more, but nothing further was done until 1935 when I was invited to join the Shell Club. The meeting of shell collectors and seeing their various collections was most interesting. I became shell crazy and wanted to have a display of shells like some I had seen. Many thanks to the several collectors who helped me to get started, and special thanks to Mr. Powell for his valuable help.

I took a fancy to the Paryphantas and made up my mind to go a-hunting.

In January 1938 I fitted a bed in my car, carried a benzine stove, cooking utensils, water, food and necessary collecting gear so as to be able to stop anywhere along the road. My first collecting was done at Levin Bush Reserve, where I found 14 live P. traversi. While at Levin I went to Hokio beach for marine shells, and found a number of Maurea cunninghami and Austrofusus glans; Dosinia and toheroa shells were in abundance. I visited this beach in 1943, but there were no shells of any kind to be seen.

After crossing Cook Strait to Picton, I climbed the mountain behind the town in search of P. hochstetteri bicolor, but none could I find. I was a new hunter and did not know where to look. On I went to Nelson, where I received directions to go up the Maitai Valley to the Doubles - had to ford the river several times, and on one occasion when the engine stalled in mid-stream, water got into the carburetor and I was quite a while getting the car out. Two days were spent on the Doubles up to 3600', but all I could find was one half grown P. hochstetteri obscura. I was getting discouraged. However, I went on to Takaka Hill, camping on the roadside at 3000', and spent two days hunting which netted me 18 live and 10 empty P. hochstetteri. It started to rain the evening of the second day, and rained all next day, so I had to sit in the car, but made good use of the time letter writing. When I got out of the car it was sitting in nine inches of water.

I went on to Onekaka to collect P. fallax, which are found up near the Iron Mine at 1500', and I found several damaged shells, but could not find anything to bring home. I made friends with people close by who later sent me approximately 50 shells.

I came back to Nelson down through the Buller Gorge to the West Coast. At Seddonville I hunted for P. unicolorata, but evidently did not know where to look; anyway I could not locate them, but I met a farmer who sent me six later. On the road near the Bluff, after crossing the Mokihinui River bridge, I made friends with a roadman, Mr. Jack Henricksen, and spent Saturday and Sunday with him. He showed me where to find P. lignaria at Glass Eye Creek. It was great finding the snails under wet moss, and I collected 31 living ones.

I came back to Seddonville and made friends with a family called Malmanck. Two of the school boys took me on an 8½ mile walk along the beach. They called it their ranch. Here they had a hut without a window, built with driftwood from the beach. There were four bunks and old rugs, and the place was very stuffy with plenty of fleas

for company. We spent three nights in here. I was very tired after walking along the rough coast and the first day we went in search of Marine shells. All I could find were limpets, and that evening I went to bed early. The younger lad went out into a small patch of bush and in a very short time arrived back with his pockets filled with snails, saying "I've found some snails!" At first I wouldn't believe him, but out of his pockets poured 20 P. lignaria. I was so thrilled!! My tiredness vanished, and the following day we three went into this patch of about 3 acres of bush and collected 300 snails, so I was very happy when I left the ranch! The boys said they had never seen these snails before. We came back with the treasure and at Seddonville I met Charlie Clarke, a beetle collector. I took him 10 miles past Karamea, as far as the car could go north on West Coast Nelson.

On the beach here under driftwood Katipo spiders were plentiful. Here we met two roadmen, Messrs. Burt Harvey and Noble Flowers. They took us to their camp, about 4 miles over the Kohiahia River, through which we had to wade at low tide. The following morning they took us up a ridge beside Katipo Creek, and at 1000 ft. we found our first snail, P. annectens. We went up to 1700' and found the snails under wet moss. It was lovely in this virgin bush with its plants and trees untouched. I had the time of my life collecting snails - thrills again! - But we had a reverse when Charlie Clarke wandered off and got lost. We hunted and called but found no trace, and the roadmen said, "Better only one out than all of us", so we returned. I was very anxious but at 11.30 p.m. he found his way out. I cam back with 300 snails and Charlie with 250.

We came back to Nelson, where Charlie left me, and I went on to Collingwood to meet Harvey and Flowers. We got as far as Brown River, a short distance bast Bainham, when it began to rain. We had to stay in a log hut for 6 days waiting for the river to get low enough to cross, but finally got started on the track with pack horses, to the Gouland Downs. At Perry Pass, 3000', in a patch of teatree near Mt. Perry, we found six P. superba. We camped in a Government hut near the Blue Duck Stream, and I saw two blue ducks, which were quite tame. In the bush close by I found 10 P. jamesoni.

We went further over the Downs to Saxon Stream, and in bush there we got 25 P. jamesoni. Further along to the Boundary Peg we pitched camp for a night and in this part we found 12 P. mouatae. These snails seemed to live in very wet places. The Gouland Downs at 2500' is a very wet place, and while I was there the clouds came rolling down along the ground. It got quite dark and I was getting alarmed, but the roadmen, being used to it, only laughed.

I heard lots of kiwi calls at night and saw holes in the soft ground where they had been. There were several deer about too. I brought home two pieces of lime found in one of the many empty crawfish shells. I also brought back a piece of wood from Gouland Downs Hut, a piece from Log Hut and a sample of wood from Perry Pass.

Back at Collingwood I left Harvey and Flowers on my journey home, where I arrived with 860 Paryphantas, 80 samples of sand and several pieces of wood.

With the Paryphantas I have since made exchanges for other shells. The trip was very enjoyable and I have added by way of exchanges a lot of new material to my collection.

ARTHUR RICHARDSON

Mytilus canaliculus Martyn.
The only mussel in N.Z. that has any commercial value.
It is dredged in fairly deep water in the Hauraki Gulf.

Macomona liliana Iredale.
This bivalve is rather common on sandy beaches
throughout New Zealand.

"COCKLES AND MUSSELS ALIVE, ALIVE OH"

The above words from the old song may have been good advertising on the part of the old-time fish wife; they are also good advice to the young conchologist. If the collector is bent on having nothing but the best of specimens then he or she must "catch 'em alive", and to do this it is necessary to learn something of the habits of the different shellfish in order to know where and when they may be found.

The rock dwellers do not present the same difficulties as those that make the mud flats and sandy beaches their habitat, for (apart from the very limited number of rock-borers) they must be either on or under the rocks, although some of course are experts at camouflage. For example, Radiacmea inconspicua, which no doubt derives its name from the fact that it is covered with the pink Nulliporites, which also coats the rocks on which it is found; or Musculus impactus, which is almost completely hidden in matted byssus threads.

On the other hand the sand dwellers, particularly those that live below the surface, are not as a rule easy to find.

It is therefore necessary to learn something of their habits and to read the signs which mark their presence.

Let me then mention just a few shells which can quite readily be found by a little careful searching.

Members of the family Amphidesmatidae are, of course, very plentiful and easy to find.

They give themselves away by breaking the surface of the sand after the tide has receded, and in hot summer weather seem almost anxious to take the air, for they will push up a clear cut ridge in the sand. Indeed they could be accused of being venturesome, if they are not even trying to copy the people who frequent their haunts by popping right out of the sand to lie flat on the beach as if sun-bathing.

Let us look now at one or two members of the family Veneridae. Indications of the presence of the common Chione stitchburyi are unmistakable and we will pass it by except to say that this fellow is collected by more than conchologists; being sought after more to satisfy the craving of the inner man than in the interests of science.

However, other members of this family are not so common nor so easy to find. Dosinia sabrosea, for instance, does not show above the surface of the sand, but seems to be very active and constantly on the move.

When left by the tide its presence is indicated by a groove in the sand, made as it moves along under the surface. This groove is a regular sweep of an arc of perhaps 18 inches to 2 feet.

Let us turn now to the family Olividae. Baryspira australis and B. depressa like the same conditions and have the same habits, and are very often found in the same locality. They too seem to believe in the motto "keep moving", and as they progress just under the surface of the sand they seem to push it a little to each side, forming two light ridges leaving a groove between.

The trails they leave vary according to the nature of the beach. On the almost flat sand at Cheltenham Beach (Auckland) for instance, they seem to wander round rather aimlessly - the track may be from 12 inches to 2 feet or more long, while on a long sloping beach like Waihi it may be up to 10 or 15 feet in a long sweep, in which case they have taken the line of least resistance by working down the slope of the beach.

But wherever they are found there is no mistaking at which end of the trail you will find the animal, for there is always a little mound where they are, and a close observation will show the little black tip of the siphon tube just through the surface of the sand. It is as well to note this little point, for seeing that both australis and depressa are quite common, you may decide you have collected sufficient and so ignore these trails with the mounds at the end and, by so doing, miss a fine specimen of Philine auriformis - the white slug which has that frail, opal shell (interior), and the three little stomach bones - for this animal leaves a very similar trail.

Another shellfish which leaves a track (somewhat broader, without the definite ridges at each side) is Haminoea zelandiae, and the mound at the end of the trail is the animal itself, camouflaged by reason of the fact that a coating of grains of sand adheres to the soft slimy part of the animal which practically covers the shell.

Pervicacia tristis is another surface dweller which trails round leaving a rather indistinct and narrow track. Without noticing the trail which the animal leaves, the shell itself is not readily seen, being rather small and narrow, with only the top pointed half showing above the surface of the sand.

Other signs could be mentioned - Alcithoe for instance in the bigger varieties, because of their size, are not hard to find when one gets to know the mound they make as they work their way along in the sand. The same applies to Struthiolaria papulosa. However, S. vermis and the smaller Alcithoe are not so readily seen.

There is another sign to take notice of: that made by some of the bivalves which keep well under the surface, and give little indication of their presence except for a small round hole in the sand.

An example of this is Zenatia acinaces, which is found some inches below the surface of the sand, but pushes its siphon up to the top. On being disturbed it will withdraw the siphon, leaving a neat round hole.

A good rule is to investigate every sign, and do not overlook anything which is in any way unusual.

It is so easy to get the mind set on one particular thing and notice it to the exclusion of everything else: it is therefore very desirable to get to know all the signs and thus be able to "catch 'em alive".

WM. P. THOMSON

COLLECTING AROUND DOUBTLESS BAY

Living on the peninsula which forms the northern bounds of Doubtless Bay, I have ample scope for collecting material in the Aupourian faunal province. Up to the present, however, most of my time has been occupied with settling into a Maori district, teaching a school composed entirely of Maori children, discharging the duties of Postmaster, Registrar of Births and Deaths of Maoris, etc. Thus the following notes are by no means an exhaustive list of mollusca to be obtained here. They are just jottings on a few of my finds. Practically nothing is given of the land fauna or of small shells which as yet are unsorted.

Two distinct areas may be recognised. Tokerau Beach is a long, sweeping, sandy beach backed by sand dunes containing moa remains; and Whatuwhiwhi, a rock-bound shore.

TOKERAU BEACH

To date, I have collected little from this locality. Of the times I have trudged 2½ miles over hills and then about 3 miles or so along the beach there has usually been little reward for the energy expended. Common shells are Amphidesma subtriangulatum, Zethalia zelandica, Venericardia purpurata, Tawera spissa, Struthiolaria papulosa and Paphirus largillierti. After a storm a few Tonna haurakiensis, Zenatia acinaces, Alcithoe depressa and an occasional Longimactra elongata were found. Quite a number of beautiful Baryspira mucronata and attractive bright yellow Struthiolaria vermis were collected. Notovola novaezelandiae provided both shells and an enjoyable meal. Occasionally Cirsotrema zelebori is scattered about. Cominella quoyana is found at low tide. Zeatrophon ambiguus, with the smooth male and more sculptured female, was washed up in numbers after a gale. I have been fortunate in picking up two of the rare Maurea pellucida spirata.

In the sand-dunes backing this beach portions of moa bones and egg shells are not uncommon. Several sub-fossil land shells are found with them. It was from here that Mr. Powell described Austrosuccinea archeyi as sub-fossil.

WHATUWHIWHI

Living within two minutes walk of this rocky shore, I have given it a fair amount of attention.

On the higher rocks, usually on the smooth ones, but by no means confined to them, Atalacmea fragilis is to be found. Usually boiling water to remove them was somewhat of an inconvenience. A portion of a safety razor blade, tapering to a point, proved an ideal weapon. It was easily inserted under the delicate shell without damaging the edges, and then the "spring" in the blade just shot the limpet off into the waiting hand. Large Lepsiella scobina, Anisodiloma lugubris and Nerita melanotragus are very common.

Rocks embedded in coarse shell sand cover some excellent specimens. The beautiful Marginella mustelina with its bright reddish-brown bands and shiny smooth surface is common. Usually there are several of them close together on the same stone. The smaller Marginella cairoma, yellowish-green with two thin orange lines on the body whorl, is similar in habitat, but more often on stones only just sitting in the sand. It is not very common. Again, the rare Fusus nestaverae is also found under similar rocks. Although all I have found are living, only a few

have the true light-brownish colour with the darker bands. Most are black. Here, the most common shell living under these stones is Cardita brookesi. I have collected quite a number of them. Fitting into crevices and along ridges of similar stones is Acar socialis. Under a rock in sand but at low tide level I found two fine large specimens of Acar sandersonae and a few smaller ones. The rarest shell living in this habitat is Lima sydneyensis. Of consolation to collectors, it is easily seen sticking out at right angles to the rock, and furthermore it is rarely that a single specimen is found on a rock. On one quite small stone I counted eleven of them, although the majority were small. Nevertheless, they are by no means common. In the sand immediately under these rocks, Notocorbula zelandica, although often stained brown, is to be found not uncommonly along with Taras striatula and Taras zelandica. Others found are Rissoina zonata, Rissoina anguina, Protothaca crassicosta, and Arca novaezelandiae.

Lower rocks have also repaid the time spent in examining them. My most prized finds under these are Pteronotus eos, Agnewia tritoniformis, and Buccinulum multilineum aupouria. I have collected four P. eos, all of which have been under rocks in little channels partially exposed at dead low tide. The first one was very small and bright yellow; whereas the rest were adult, yellow underneath and dirty cream on top. This find extends its range northward from Whangaroa. My two very fine Agnewia were found under seaweed covered rocks. The previous record of this rarity was from Whangaroa. To date, only one Buccinulum multilineum aupouria has yielded to my searchings. Of course, Scutus is common. Tugali elegans is not uncommon, and several Tugali suteri bascauda (distinguished from young elegans by possessing parallel sides) have been taken. The slit limpet, Emarginula striatula, has been collected washed up on the beach and alive under stones at low tide. Thoristella oppressa is common under rocks in the intertidal zone. I have collected Trochus viridus living and Trochus tiaratus dead. In clean water under stones and ledges in seaweed covered pools Haliotis iris is very common, and small H. australis are sometimes found. The former is eagerly sought for food and for the shell. They are delicious. Buccinulum lineum is not altogether uncommon under rocks, especially in little crevices under seaweed. Buccinulum robustum is also found here.

Moving out on to the seaweed one may find scores of Micrelenchus dilatatus, a few M. oliveri, Cantharidus opalus, and C. purpuratus. Of the two latter C. opalus is the more common. Only two Maurea tigris have been found moving across seaweed-covered rocks at low tide.

Hermit crabs have not yet been very useful, but recently I captured a fine example of the very rare Philippia lutea from one, and I keep hoping some of his friends may come along with similar houses on their backs.

Austromitra rubiradix is not uncommon under rocks about low tide. It is often found on sea squirts. The colour is purplish-black and the columella orange. A. antipodum is to be picked up dead among coarse shell sand.

The Maori children have proved useful in scratching among the sand for the beautiful little Pellax huttoni. The Cominella virgata found here represents a new subspecies which is being described by Mr. Powell. It has no spiral lines as are found in the species (except old worn shells with the outer coat worn off, where there are close spirals on the upper whorls); the colour is light greyish-

blue, and the most noticeable feature is the wavy axials. Zemyllita stowei is occasionally found living, but usually one finds only single valves.

DOUGLAS G. FORSYTH

NOTE ON RHYTIDA GREENWOODI

During the trip mentioned in the "Brief Note on Maurea punctulata" Mr. Thompson and I were fortunate in discovering this species on an island off Hahei. This small bush-clad island is separated from the mainland by a deep channel, so that the Rhytida has probably been isolated for a long time. The most remarkable thing about them was their numbers, a dozen or so being found in about half an hour's search among deal Rangiora leaves.

On the mainland they were much less numerous and a great deal of hunting among similar bush revealed very few specimens, though dead shells were more common.

In this connection I may mention that we found several specimens with smaller ones inside their shells, and we rather suspected them of cannibalism. We did not have time to investigate this as carefully as we would like to have done.

F. G. SHORT

NOTES ON COLLECTING AND DREDGING AT AWARUA BAY) - NELSON PROVINCE.

Perhaps I had better tell you where our place is. We are situated between Able Head and East of Separation Point. Our beach at Awarua is about a mile long and between this beach and Separation , there are five more , each between half a mile and a mile long. There is a small beach at the west end of ours at Awarua Heads but Awarua itself is practically surrounded by hills and has a big tidal harbour.

July we find is about the best month for shells to be washed up on the beach and a few years ago we collected quantities Penope zelandica and transparent specimens of Atrina zelandica. A month ago we got quite a lot of live Tenea zelandica, and also a few Philine auriformis alive for the first time.

We find Anomia walteri and Monia zelandica on rocks and mussels at the small beach and from sandy mud collected there we wash out Zemyllita stowei and other small shells. Very pretty sea slugs occur at times among the rocks.

Dredging is rather fun, as well as hard work, as you never know what is coming in. We get dozens of long legged starfish but as soon as are touched their legs fall off. Sometimes we get oysters and scallops(the latter set on the stove with butter put into the shells when they open make a feast fit for a king).

Among the rarer shells we get by dredging are - Beryspira novaezelandiae ;Neilo australis, Scalpomactra scalpellum ,Eximiothracia vitrea, Aeneator marshalli, Glaphrina vulpicolor, Maurea cunninghami, Poiricia zelandica, Cadulus dubiatulus, Emarginula striatula and Nemocardium Pulchellum.

L. HADFIELD.

A TRIP TO WHITIANGA

Leaving Auckland on the Lady Jocelyn on Monday, 29th December at 7.45 p.m., I found I had the unexpected pleasure of the company of Mr. and Mrs. Turbott, who, I recalled, gave a lecture at the Auckland University during the year, so after introducing myself, we became shipboard friends for the rest of the journey, which promised to be a comparatively calm one. The vessel did not cater for passengers, so the not so spacious decking became the sleeping quarters of the dozen or so passengers who had chosen this mode of travel.

After a fitful night's dozing with the chug chug of the auxilliary engines in our ears, and a slight southerly swell rolling the little craft from side to side, we rose to greet the dawn of another beautiful sunny day. By this time - about 5 a.m., we were just off Cape Colville, which stood in all its rugged grandeur. To the south was Slipper Island, which is very appropriately named, looking for all the world like a giant slipper. The coastline from here is very rugged and beautiful, with pinnacle rocks thrust up out of the sea here and there as if by some mighty hand. Numerous penguins and various other sea birds were observed, and also schools of dolphin, but none came near the ship.

On arriving at Whitianga about 11.30 a.m. my shipboard friends and I parted company and I set off on my cycle for one of the camping sites. On my arrival after a two mile ride along the road facing the beach, I was taken pity on by the campers, who offered me a cup of tea and asked how far I had come, thinking perhaps that I had ridden over the ranges; however, I felt I was among friends, so asked if I might put my gear in their tent for safe keeping, and was allowed to do so. I then set out for a stroll along the beach, which is two miles in length.

The first thing I came across was a specimen of that rare bivalve Angulus spenceri, which I recognised without a doubt. Lady Luck must have been with me, for I picked up half a dozen whole specimens that afternoon, and during the nine day's stay twenty-two specimens were found.

Xenophalium pyrum was fairly common, though none were found alive. The tides being nothing exceptional, collecting was confined mostly to high water mark and half tide, and whatever happened to be cast up on the beaches. One specimen of a new subspecies of Xenophalium was found, the difference from X. pyrum being that it has denticles slightly marked on the outer lip and three rows of nodules on the body whorl strengthening towards the outer lip. The species has not yet been named. Specimens of Panope zelandica were plentiful, some with the hinge intact, but no live specimens were found. Struthiolaria papulosa was common, but even the living specimens had the apex missing - presumably knocked off by the surf, which rolls in from the ocean continuously. Three broken samples of Tenna haurakiensis were found on the main beach, but unfortunately in no condition for a collection. Notoacmaea pileopsis was collected from caverns, and also a curious kind of barnacle which goes by the name of Mitella sertus, figured in Mr. Powell's book "Native Animals of New Zealand". Struthiolaria vermis seemed to be rather uncommon; one dead specimen only was collected.

The last four days were spent in collecting land snails, which were none too plentiful, as the ground was very dry and creek beds were partially covered by leaves and other debris. Under all this, small land snails and very numerous

dead specimens of Potamopyrgus were found. Sixteen specimens of Rhytida greenwoodi and fourteen Linnea egea, a number of Delos carosia, Lyonia lunonias and various other species were found also.

The bush in Whitianga itself is very sparse. The few isolated patches are situated along the sea front covering steep cliff faces, or in gullies. Beaches in this area are numerous and beautiful, but the main one, Buffalo Beach, seemed to have the best collection of shells, and I'm sure that if the tide had been right and I had been able to visit the low tidal zones I should have collected a good variety of molluscs - that is, judging by fragments found on the beach. Perhaps, too, I might have done better if someone who knew the game more had been with me.

Leaving Whitianga after a pleasant holiday, and with a sun tan to be proud of, I once more settled down to the hum drum life in the big city.

A. K. HIPKINS

AN INTERESTING COAST-LINE.

Of all the places in which I have collected shells around New Zealand, I consider the Collingwood beaches and mountains are the best.

There are miles and miles of beaches right from East of Takaka to Farewell Spit, broken by rivers and headlands. The rocks are full of fossils from the sea to well back in the mountains.

On the beaches down there Cominella and Zediloma are among the hardest to find, but Aeneator and Neilo occur in many localities. I have seen Austrofusus glans in hundreds, with the fish just dead. Echinocardium australe also comes ashore in countless numbers. I have often picked up Tawera zelandica but never alive. Divaricella was fairly plentiful, but you have to go well east to get the very large ones.

Pakawa is a lovely beach to the west of Collingwood. The katipo spider is an unwelcome dweller there, and at night the penguins come ashore to the sandhills. Perfect specimens of Offadesma angasi and Nemocardium pulchellum, also the pretty pink Tellina, are quite common after storms.

Close to Pakawa an arm of the sea comes within a mile or two of the northern waters. It is called West Haven Inlet. From this inlet I got beautiful Maurea tigris, Xenophalium pyrum, and also a perfect specimen of Charonia capax.

About here, often at sea level Paryphanta are found. The coast begins to turn north just past the inlet road, and then curves away to the N.E. for thirteen miles to the lighthouse at the end of the Spit. There is a bank of shell out there that would be worth a visit.

On the West Coast, just where the Spit begins, great masses of fossiliferous rock came down at the time of the Murchison earthquake, but it is too hard to get the shells out. The limestone caves and rock formations in the district are wonderful. It is a paradise for the geologist and Palaeontologist Many Maori curios have been unearthed about here.

Out on the rocks the family Patelloididea is very well represented, the shells being all beautifully clean for they get the full force of the Tasman Sea.

MARY MOUAT.

AMATEUR AQUARIUM.

The creating and maintaining of an aquarium, however small, establishes a tie in one's normal life, but no more than do dairy cows or chickens, and not smelly. All have to be attended to twice daily, and all have their compensations - or do they?

There is no suggestion that the following notes apply to aquarium proper, where marine life is more or less permanent and feeding is done scientifically; they are simply the experiences of a very amateurish amateur, who sees beauty in a Siphunculus, and where the stay of the majority of creatures is transitory - here today, and in the sea again tomorrow.

The outfit consists of two flat-bottomed zinc basins, each containing about fourteen pints, a shallow glass dish for close-up observation, a short length of hose for siphoning the water out, a dipper for replenishing the bowls with water and a powerful flash lamp over the dishes. The essential thing is, of course, easy access to salt water.

The compensation for any trouble taken more than outweighs any slight inconveniences, such as the upsetting of a bucket of water on to the carpets of the bedroom or hall.

The advantage of having the aquarium in the bedroom is enormous. One can be in and out of bed all night when nocturnal animals are under review, or when some creature exploring its surroundings oversteps the mark and rattles on to the floor - a common happening with some of the shell fish and chitons. A Charonia can make quite a crash.

The only permanent fixtures are the stones on which grow the anemones and seaweed, although some of the subjects have lived as long as five months, i.e. Arca novaezelandiae, and there is usually a Cominella of sorts in each dish acting as a scavenger.

The water is changed twice daily. Occasionally the whole "boiling" is temporarily removed and the dishes thoroughly cleaned. This constitutes a spring tide, and good time is had by all.

The only feeding is to the anemones, which have fragments of pipi presented to them once in a while on the tip of a paint brush; they appear to love it.

Anyone who knows the animals mentioned will realize what a beautiful sea garden can be made with a little attention to colour scheme, especially lovely under a strong electric light.

Some of the animals in the following list were only in the dishes a few hours, but as they were there at the time of listing, they are included.

7th. November 1947.

Live shells.

I Cabestana spengleri.	I Cabestanimorpha exarata.
I Trichosirus inornatus.	I Phenatoma novaezelandiae.
I Arca novaezelandiae.	2 Maurea tigris (one juvenile)

Anemones.

I Phlyctenactis (small specimen). I Actinia.

A large variety of beautiful coloured anemones, some brown with a pink frill, others brown and white, the centres blue, yellow or pink.

I stone with 40 heads, yellowish green stem, pink frill green centre. (This was brought up from 20 fathoms on a fishing line.)

Nudibranchs.

3 Necromantes.	I Pleurobranchaea.
3 Glossodoris	I Aphelodoris.

3 Atagema.
2 Rostanga.
2 Ctenodoris.
1 Alloiocoris.
2 Dendrodoris.
4 Bouvieria.
1 Agloja.
2 Dolicheolis.

Odds and ends

I Diphunculus.
I deep red star-fish.
I crab.
I crab
2 spawn coils.(Atagema :pure white. Ctenodoris orange.)

GORDON WILLIAMS.

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It is well known among collecters that our prized land snails of the genus Paryphanta are carnivorous, and live on large earthworms which abound in the humus; but what of the smaller members of the family Paryphantidae?

A short time ago in some Auckland bush one small Delos coresia was observed devouring the flesh of a large specimen of Laoma poecilosticta, while another was half way through a meal of Phenacohelix ponsonbyi - a snail several times larger than itself. In both cases the slayer had crawled inside the aperture of its victim's shell. and did not appear to be encountering much opposition,(having probably smothered the creature beforehand.)

On Mt. Wellington, Delos was found feeding on the small white snail Fectola caput-spinulae, so doubtless varies its diet according to taste.

E. N. HOUGHTON.

.....

Decomposing vegetable matter in our streams is the main cause of the unsightly erosion which spoils so many of our freshwater mussels. If the acids in the water eat off the hard outer covering or epidermis, the erosion may proceed at a very rapid pace, and so endanger the life of the mollusc . Specimens from clear mountain streams are always the most perfect.

N. W. GARDNER.

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BULLETIN No, 4 AUCKLAND, NEW ZEALAND

AUCKLAND MUSEUM CONCHOLOGY CLUB

BULLETIN NO.4

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PREFACE

Although the publication of Bulletin No.4 is somewhat late, the committee is sure that everyone will find great enjoyment in reading the varied and most interesting articles written by club members.

Our membership is still increasing, and quite a number of new enthusiasts have joined our ranks. The total membership to date is 65.

Once again we are indebted to Mr. A.W.B. Powell, who read and checked the articles, to Miss P.C. Boyd for her good work in cutting stencils and cyclostyling the bulletin, and also to Mr. F.W. Short and Mr. and Mrs. M. Gardner for their help in the editing of our publication.

A. K. HIPKINS

Hon. Secretary

March, 1949

'UNEXPECTED PLEASURES'.

The writer George Eliot was evidently of the opinion that the study of shells and shell life is a light one. Be that as it may, the work of securing good live specimens can be very heavy. Anyone observing a conchologist at work on a rock-strewn foreshore must be amazed at the amount of stone that is lifted and heaved with apparent zest.

Working against time and tide, as is usually the case, the keen collector never stops to estimate the total weight of the rocks he or she must shift in a short hour or so. Anticipation is the driving force which supplies the energy for the task, but it takes realisation to add zest to it; however, the fullest measure of joy and satisfaction comes when something new and unexpected is found.

Spending a week or two at Manly Beach one year, the writer was able to search some of the rocky points which lie out on Whangaparaos Peninsular and had the unexpected pleasure of coming across a colony of Zemyllita stowei. I was working round a point where quite a considerable area was strewn with boulders lying on a muddy bottom and finding, to my pleasure, some fine specimens of Buccinulum vittatum. On turning over one quite small stone, there I saw the colony of Z. stowei, big and small, looking like a well organised comunity, their home being really in the mud under the stone. This unexpected pleasure acted as a great stimulus to me and I set to work movin a ton or two more boulders in an endeavour to find more specimens, but without success.

Coming now to another occasion of experiencing an unexpected pleasure, calls to mind the old saying " If at first you dont succeed, try again ".

Camping one Christmas at Martin's Beach (Mahurangi Peninsular) I was working a most promising looking, yet tantalising stretch of rocks which runs out to Pullet Point. It was toward the end of the day, and I was very conscious that I had a back, having lifted every boulder possible, and tried many that were impossible, and was turning over what I had decided would be the last rock, when, to my surprise and great pleasure I found two shells - one, a small Contharidus purpuratus, and the other - well, what could it be? A beautiful little shell with a pointed spire and brown coloured, fine zigzag markings - it was a Daphnella cancellata. Forgetting all about my aching back and tired muscles, I did not leave a stone unturned for a considerable area, but not another one could I find - at least not then.

Back in camp that night, sorting out my specimens, and coming to this D. cancellata not being familiar with it I looked first of all to see if there was an operculum, but could not even see the animal itself so came to the conclusion that the shell must have been inhabited by a hermit crab, and that it was to one of these helpful fellows I was inbebted for this shell.

This conclusion seemed to be supported when later I consulted Suter's Manual which listed this shell as living in deep water and only being found occasionally when washed up by storms .

Twelve months later, however, I returned to the same spot, and working again the same rocky coast, what greater pleasure could I have, when, on turning over a boulder, I came across, not one, but a colony of four D. cancellata.

I then realised that I had really found the home of these very beautiful shells.

It may be that the deeper waters are the usual habitat

of these fellows, but this colony certainly seemed quite at home under that boulder at low-water mark.

Whatever else I found on that occasion I do not remember off-hand, but in this find I felt I had been more than rewarded, and it was indeed a most unexpected pleasure.

WM. P. THOMSON.

" GO TAKE A LOOK "

Two miles from the sea! Yes it is a long way. When the tide is in, it's mostly salt, and when it's out, it's fresh, so let's say it's nearly fifty-fifty on the thin side. There is some sand but it's mostly mud.

On first thoughts this does not sound like an interesting place to go shell hunting, especially when we remember that two miles from the sea. Well on one particular afternoon not long ago when available time was short it looked as if necessity had taken a hand and this uninviting spot on the upper Taipa River was to be our hunting ground. As the tide was not quite low on our way out, we confined our hunting more or less to the upper tidal belt along the edge of the rushes and driftwood. Dozens of very fine specimens of Ophicardelus costellaris came to light and a small bottle was soon filled with the best samples. Good samples too, which did not show any corrosive action from the fresh water. Dotted about the mud were many fine examples of Amphibola crenata and to add to our lean bag we collected a few of these.

However, hunting was not good, so after an hour or so we turned for home. The tide was now low and as the going was easier in the few inches of water in the sandy river bed I walked along here. Odd cockle shells showed on the sand and as I paddled along making ever widening ripples on the water surface I noticed a limpet on a cockle shell. " No, " I thought " It just cant be a limpet." Without more thought, up came the said limpet for closer inspection. Yes, It was a real live limpet. A few minutes hunt found a dozen or more fellow travellers, and into a bottle they all went.

I found later that I had stumbled on a colony of Notoacmea helmsi of a fine big size. This find started the hunt for other shellfish and soon were some extra big Melanopsis trifasciata complete with the tip and showing no sign of the shell being eaten away, together with a host of Potamopyrgus, all little smooth ones.

Now I'd got a puzzle for myself; here was what I had always considered to be a saltwater shell living in almost fresh water, and along with a host of fresh water dwellers, and all in what appeared at first inspection to be an uninviting spot. Still, this just goes to show that if we are to be good hunters of shells we would be wise to remember that even if the spot looks poor it's a good idea to " Go take a look".

G. ALF HANCOX JNR.

DREDGING BETWEEN SEPARATION POINT AND KAWAU, TASMAN BAY IN JULY 1948.

Dredging for shells is a very interesting pastime, and while dredging in the above locality many fine specimens were hauled up recently. One fine specimen 1⅝ inches across of Pallium convexum (Q&G), some excellent specimens of Chlamys gemmulata (Reeve), a few Zeatrophon ambiguus(Philippi) and one or two Glaphyrina vulpicolor (Sowerby) together with two Tugali sp. and many others.

W. V. HADFIELD.

A SOUTHERN COLLECTING TRIP

My first attempt at describing a shell collecting trip dealt with one spent in the far North. This time I will try to describe a visit paid to the West Nelson district in search of Paryphanta.

As I am just a laymen and a good "scout" for my wife, readers will excuse me for not attempting to give scientific details etc. This is just a story of a very pleasant holiday spent in company with my old friend Mr. A. C. O'Connor.

Transport difficulties were nil, as Mr. O'Connor took his car, so we were therefore free to go where we liked and stop where we liked, which certainly could not be done if dependent upon service cars.

After a somewhat rough crossing of Cook Strait, we steamed into Nelson at 6 a.m. on 6th November 1946. Nelson has the record of having the most hours of sunshine of any New Zealand town and that morning lived up to its reputation, as the day was bright and clear.

Soon we were on the road westwards and as this was my first visit to Nelson Province, I was keenly interested in all I saw. The mountains with their snow-capped peaks, and the glorious views of the coast line, seen from some of the higher points of the road, revealed some of New Zealand's scenic attractions.

After leaving Riwaka, we started to climb the famous Takaka Hill and when at the top we found ourselves 2500 ft. above sea level. With snow-capped mountains stretching to the south as far as the eye could see, I realized that Nelson Province contained very little flat land.

A few hundred feet from the summit we stopped, and I had my first experience of collecting southern Paryphanta. These P. hochstetteri and it was certainly a good beginning for our trip.

At Collingwood we turned inland and fourteen miles further on saw us reach our destination, Bainham. Here Mr. Tom Allan, a friend of Mr. O'Connor, met us and we drove to his hut three miles further on. I say "hut" because you could hardly call a 10 x 7 shack a house. I must say things were a little cramped, but as we had come prepared to rough it, we made the best of it.

At one end of the hut were three bunks, one above the other, with about 2 ft. 6 in. clearance between each. The problem of storing our gear was solved by putting it all on our beds during the day, and then when we retired, stacking it all on the floor. This just left room to get out to the door. It was not long before I called our abode the "Sardine Inn".

Next morning before breakfast I had a good look round to see "just where we were". Fifty yards away was the Arore River, a swift flowing snow-fed one, that at this point had carved its way through rock to a depth of over 70 feet, and it gave one a queer feeling to stand on the narrow swing bridge and gaze into the water below. I heard later how, during floods, logs coming down this river just cleared the swing bridge. All around us were bush clad hills and mountains, the latter carrying a good coating of snow. It was upon some of these high peaks that we were to do our collecting.

That day we spent hunting for small stuff in near by patches of bush, and had quite a successful day. During

the night the "weather clerk" gave us a cold welcome and in the morning we awoke to find the hills just at the back of us well coated with snow. That put an end to Paryphanta that day, so we drove to the beach at Parapara, past Collingwood, for marine collecting.

Saturday, 9th November, saw us making our way to Mt. Burnett, a distance of fifteen miles, and doing our first good collecting. This was P. gillisii and we came away with a fair catch, taken from only a height of 100 ft. Mr. O'Connor had previously collected at 700 ft., but as we found a dead shell just a few feet up the track we entered the bush there and soon "struck it rich".

Later on we drove further along the coast and did quite fair marine collecting on Pakawhau Beach.

That night, as the weather looked like keeping fine, we made plans for an early start next morning on Bock Peak, 3200 ft., in search of P. montana. At 7.30 a.m. on Sunday we started our long climb, and five hours later reached the top. Our progress was slow on account of the thick bush we had to go through, and as we had to keep to one particular ridge, we blazed a trail all the way up, that is, we made marks with a small axe on trees every few yards, so that we could find our way out again. When near the top we found traces of snow and everything underfoot was wet and cold.

The bush finished at 3000 ft. and in its place was Senecia, a short prickly shrub about five feet high, and snow grass. The vegetation was like hairs on a dog's back, and our collecting had to be done on hands and knees, trying to avoid as many scratches as possible from the Senecia. The wekas (native birds) seemed very fond of "montana" judging by the number of pecked shells we found, and it was quite a while before we found our first live shell. Most were found well under the clumps of snow grass, and it was certainly a thrill to feel one when stretched out full length, searching under this grass.

Apart from a few good deads, our lives only totalled 20, but we were well satisfied with our day's work. The down trip took 2½ hours and thanks to our blazed trail we had no difficulty in finding our way out. It was a tired but somewhat happy party that reached "Sardine Inn" at 7 p.m.

As our next collecting was to be done on Cedar Ridge, above the Quartz Ranges, Tom and I made a trip up to his top hut next afternoon with supplies etc. This was a walk of four miles to 1500 ft., and I found the hut very roomy compared with our inn.

The following day it rained all day, so the "sardines" were in that day. The rain cleared sufficiently next afternoon for us to start out with full packs for the top hut. Mine weighed 30 lbs. but felt like 100 lbs. by the time I got to the end of the journey. We were no sooner inside than down came the rain and for two days it just pelted down, and so kept us inside round the fire keeping warm. This open fire place was very novel in the fact that all around it were nine-inch steel pipes, with the open ends in front of the fire place. It was a great place to put one's feet in, to get them warm. In fact you couldn't keep them there very long.

On the third morning the weather took a turn for the better, but it by no means looked like being fine. As we were getting a bit fed up of being stuck inside we decided to collect P. superba on Cedar Ridge, 2500 ft., rain or no rain, so off we went.

Quartz Ranges, where we were camped, was the scene of active gold mining many years ago, and our track to Cedar Ridge led us past several old workings. Tom, who knew the country well, pointed out one old claim, from which 900 ozs. of gold were taken, from an area of two square chains.

The miners won their gold by sluicing and to get water they dug a trench round a mountain side to the Boulder Lake, a distance of 14 miles, and the remains of the old trench is still there. The water had a fall of over 300 ft. to the workings, and by a series of pipes from 3 ft. in diameter down to six inches, a terrific force of water was obtained. The result is seen in whole hillsides that have been washed away in the search for gold. I could write lots more about these old workings, but I must push on, for we are looking for shells, not gold.

As the name suggests, Cedar Ridge is composed mostly of a magnificent stand of cedar timber, and it was not long before we were blazing a trail along this ridge and silently cursing the rain that was starting to fall. Soon we were wet up to our waists and remained that way for the rest of the day.

It was early afternoon before we reached our hunting ground and collecting was done under very unpleasant conditions, as the snow grass was wet and cold and the snails very few and far between. My method of looking under snow grass was to stand astride the plant where possible, head down, and search underneath. Once when doing this, I thought I had found a superba but discovered I was only holding on to the toe of my boot!

It was three wet, cold and hungry men that returned to the hut that night. It was not long before Mr. O'Connor and I were standing in our "birthday" suits, in front of a roaring fire and, what with a good nip of rum, soon felt like tackling Cedar Ridge again.

Next day, as the weather showed no signs of clearing, we made tracks for the lower hut, sheltering from passing showers on the way down.

On Sunday 17th November we drove to Onekaka in search of P. fallax. When we left (and returned) to Bainham, it was wet and cold, but on the coast at Onekaka we enjoyed glorious sunshine. We collected at 700 ft. and live "fallax" were few and far between, although dead ones were plentiful. Here again wekas had been playing havoc, and in my opinion it will be these birds and not collectors that will kill these shells out. The view from here showed Golden Bay in its beauty, with Farewell Spit in the far distance. On a very clear day it is possible to see Mt. Egmont.

Next day saw more rain falling and us confined to our shack with little hope of doing any collecting. I asked one of the locals at the store in Bainham one day how they managed during the drought of last year. I was told they had about three weeks of fine weather, while we in the Auckland Province didn't see rain for three months. I heard afterwards that the rainfall for Bainham Valley is 150 inches per year, so that accounts for all our wet days.

The next Paryphanta marked down for collecting was compta, and an early start was made for the Castles, 1845 ft., on 19th November. A six mile walk over an easy grade found us in heavy bush, hot on the trail of compta. It was not long before we found them as they were lying about in hundreds - dead. Only six live ones were found, but as

the deads were perfect and only recently dead, we collected several. The formation of the country here was limestone with deep crevices running in all directions, making it dangerous if one forgot to look where he or she was going.

The following day we took things easy by collecting small stuff nearby. The 21st saw us add P. gillisii subfusca form B to our bag, and these we collected at White Pine Creek.

By now we had collected all species of Paryphanta that were within reach, so moved on to Takaka and made P. hochstetteri our next victim on the list.

A good day's collecting was spent in the bush near Canaan. It was here that wild pigs had been playing havoc with the snails. Acres of bush ground had been rooted over by pigs and their success must have been great, judging by the number of crushed shells we saw.

Fortune, who had smiled upon us all through our trip, left us sadly in the lurch that day. On our return to Takaka the car broke down, a shock absorber having given out, owing to the rough nature of the road, and placing us in rather an awkward predicament. However, by careful driving we reached the main road and left the car at a friend's place. Borrowing his car, we returned to Takaka, collected our gear and spent the night with our friend from whom we had borrowed the car. Next morning we limped down Takaka Hill and had temporary repairs made at Riwaka.

From then on all was plain sailing and my home was finally reached on 28th November. Thus ended a very pleasant collecting trip and one which I will always remember and look forward to doing again.

E.T.B. WORTHY

A STRANGE COMMUNITY

The collector soon learns to look for certain shellfish in a particular zone and habitat, e.g. Melahaphe oliveri on rocks about high tide mark, or Baryspira australis half buried on low tidal sandflats. Occasionally, however, conditions will be found where the normal arrangement is upset.

An example is found above high tide mark at McKenzie Bay, Rangitoto, where a salt water pool about 20 ft. in diameter has been shut in by a boulder bank. It is probably connected to the rising and falling tides by seepage through the loose rocks.

One side of the pool is quite shallow, while the other is several feet deep. The stones are all covered underneath with pink sea anemones and large, prettily marked Acanthochiton zelandicus. Scutus breviculus, usually found under low tidal rocks, is also very common together with extremely large specimens of Lunella smaragda. The largest of the latter seem to have died out, but some collected here about ten years ago had opercula almost one inch in diameter.

On the shallow side of the pool a small mangrove is flourishing and large 'sheets' of Ulva, the green sea lettuce, grow round the edges. Zeacumantus subcarinatus is abundant on this weed which, by photo-synthesis, probably helps to prevent the water from becoming stagnant.

N. HOUGHTON

NOTES ON THE ANATOMY OF CHITONS

The Chitons are marine and usually inter-tidal, but may extend down to 2000 fathoms. In geological time they date from the Ordovician. The chief differences from the type noted are the partial or complete covering of the valves by the mantle. They are all vegetarian, feeding on minute Algae and Diatoms.

Externals: The dorsal aspect shows two regions: the peripheral part or girdle, narrow and ornamented with tiny scales or bristles. The central part is large and occupied by eight transverse valves arranged in regular order one behind the other and overlapping from before The valves are so hinged that the animal can roll into a ball.

The mantle is separated by a narrow groove from the oval foot occupying the greater part of the under surface. Marking the anterior end and just above the foot is the mouth, surrounded by transverse muscular lips. The anterior end is separated from the foot by a shallow groove and is the "head". The anus lies in the median line just above the posterior end of the foot. In the mantle cavity and extending from the posterior end for most of the distance along the sides of the animal are the serially arranged branchial organs or ctenidia, with delicate plates pinnately arranged along a central axis that is attached to the roof of the mantle cavity.

Digestive System: The mouth leads straight to the Buccal Cavity, which houses the characteristic molluscan organ (except Bivalves) the Odontophore, which bears the radula. 2 Parts:- (1) Radula. On the floor of the Buccal Cavity. The parallel rows of teeth are on the free surface of the sheath. The kind, shape and arrangement of teeth on the radula are important in classification, certain types being characteristic of genera or even families. In a typical case there are 17 longitudinal rows grouped into Centrals, Laterals and Marginals; 3 centrals, 1 big lateral, 2 small laterals, 1 large marginal, 3 accessory marginals. Dental formula (3 + 1) (2 + 1) 3 (1 + 2) (1 + 3). See Powell's "Shellfish of New Zealand", p.12. The radula may be coiled like a watchspring in the radula sac.

(2) Rotella. A cushion like ridge of two masses of cartilage and muscles, which move the teeth and even push the whole odontophore out through the mouth.

The Buccal Cavity leads to a short Oesophagus on the sides of which are the salivary glands, which ducts lead into the buccal cavity. The stomach is fairly large and partly surrounded by a pair of digestive glands called the "liver", their ducts entering the stomach. The intestine is long, thin and coiled in the centre of the body. From it the uniform Rectum leads straight to the Anus.

Blood System: It is simple. The heart is symmetrically placed in a wide Pericardium in the rear dorsal region. It consists of a central elongated Ventricle on each of which is a thin walled auricle with two openings to the ventricle. Anteriorly the heart gives off a median dorsal aorta, running forward taking colourless blood into various arteries that deliver it into a series of sinuses. From these blood passes to the Ctenidia to be oxygenated and thence back to the auricles.

Respiration: The organs of respiration are the Ctenidia or gills depending from the roof of the mantle cavity. They range in number from 14-80 in the various species. These are well supplied with blood and are specially adapted for the absorption of oxygen dissolved in the water.

Nervous System: There is a broad ring of nerve tissue, the Cerebral Mass, around the oesophagus. Given off ventro-laterally are two pairs of longitudinal nerve trunks which pass back parallel. One pair, the Pedal Cords, dive deep into the foot and innervate it. They are connected by delicate commissures. The upper pair, the Pallial or Pluceal Cords, supply the regions of the mouth, gills, mantle and some of the viscera and are joined in the region of the rectum. The buccal commissures of two trunks pass forward from the cerebral mass and unite to form two small ganglia which supply nerves to the lips. Sub-radular commissures arise from the ventral portion of the nerve ring and unite in two ganglia which supply the odontophore. The visceral commissure passes from the pallial nerves near their origin. It also has small ganglia below the anterior end of the stomach which they supply.

Excretory System: Two symmetrical "kidneys" open internally into the pericardium or space surrounding the heart by a funnel-like opening. Each consists of a looped main tube into which open minute tubules which run among the body organs. Waste is thus filtered off from the body fluids and reaches the exterior by a small aperture two of the rear gills a short distance in front of the anus.

Sense Organs: The familiar tentacles of the Gasteropods are absent, but at the sides of the mouth are two processes, Labial Palps, which may act in the same way. In the buccal cavity are cup-shaped Gustatory Organs (Taste?). In some chitons there are organs sensitive to light. These are Aesthetes and they lie in canals in the superficial layer of the shell valves. They may take the form of eyes with cornea, lens, pigment layer, iris and retina.

Reproduction: Little is known of the habits of Chitons in this respect (Powell, "Shellfish of N.Z." p.48). The sexes are separate, but the gonads, testis or ovary differ only in colour. The gonad is an unpaired sac central and dorsal above the alimentary canal. From the rear ventral surface are given off two symmetrical gonoducts which pass back and open into the mantle cavity in front of the renal apertures. Fertilization is external. Eggs are laid singly or in strips - sometimes deposited in a glutinous cloud, sometimes retained in the mantle cavity where they undergo early development. The result is a larva, trochophore. There is no free-swimming Veliger larva and hence distribution is often local.

J. D. JEPSON

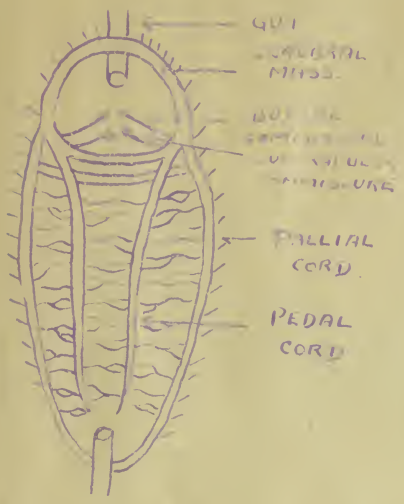
BLUE MOON BUTTERFLIES IN NORTH AUCKLAND

On two occasions these butterflies have been observed at Mangonui, North Auckland, where it is thought that they are breeding on a common garden weed. The females have not been observed in the area about Mangonui, but may have been missed because, although their markings are widely different, the colouring is very similar to the very plentiful monarch.

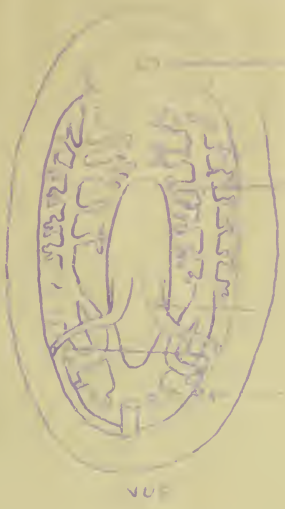
E. S. RICHARDSON

CHITON

NERVE SYSTEM



EXCRETION & REPRODUCTION



ANUS

INTESTINE

KIDNEY

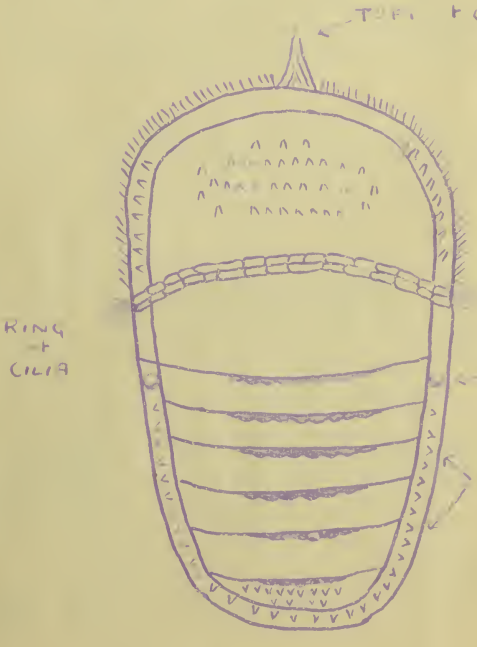
HEART

PEDAL CORD

LIVER

ODONTOPHORE

MOUTH



SHELL COLLECTING AROUND LEIGH

Leigh is a small coastal village about fifty miles North of Auckland and a glance at the map will show that it is located on the east coast approximately half way between Auckland and Whangarei. The surrounding area is an excellent place to collect shells, as there are a couple of harbours, a long sandy ocean beach, plenty of tidal sand and mud flats, rock pools, a long stretch of rocky open coast, very deep clean water off shore, and, in places, numerous small sandy coves and beaches. In fact, every type of hunting ground that a marine collector could wish for.

Leigh Harbour is rather muddy and shallow, as it is gradually becoming silted up, but in spite of this I have collected plenty of shells here. Five species of Cominella are common: C. glandiformis, C. quoyana, C. virgata, C. maculosa and C. adspersa, the last named being fine large specimens, not the least bit eroded. Also common are: Chione stutchburyi, Notocorbula zelandica, Macomona liliana, Verconella adusta, Trochus viridis, Chalmys zelandiae, Dosinula zelandica, and Cookia sulcata. At times I have found Alcithoe arabica, Maurea tigris, Struthiolaria vermis, and Turenpul octogonus, but these are not common. Once or twice I have seen odd valves of Myadora boltoni, but have never found any complete shells. One day I caught a baby octopus at low water and I keep it in a jar of spirits. Mr. Powell told me that he dredged up a live Xenophora about a quarter mile off the harbour, and Astraea heliotropium is often caught there in nets. The most common limpet in the harbour is Cellana ornata, some of which grow to a large size, with the outer surface much eroded, while Notoacmea helmsi is also abundant under stones. Other limpets are found here as well, but are not so common. On the wharf piles are many rock oysters, mostly small, living in the company of the common small mussel, while under the wharf are plenty of Atrina zelandica. I hope one day to construct a dredge and try the harbour bottom for specimens.

About four miles south of Leigh is Ti Point. This is an area which I have not yet explored very thoroughly, but even a cursory examination of the locality has proved to be well worth the effort. Down to low water mark are massive boulders which give way to sand, and in many places are pockets of shell sand in among the boulders. In this sand are large quantities of Tawera spisca - juvenile to adult specimens - Venericardia purpurata, Dosinia anaiana, Terebra tristis, Gari stangeri, and a few Soletellina nitida. Also living buried in the sand are young Glycymeris laticostata and G. modesta, some of which have almost reached the adult stage. Both these species are very common blown ashore after gales. On top of the rocks are lots of Cellana radians, some of which are extremely large, and underneath these boulders I have found Verconella adusta mandarinoides, Mayena australasia, Cabestana spengleri, a few Conoplex parthenopeus, and one Trichosirius ornatus. Under smaller stones are Chalmys zelandiae, Tugali elegans, Buccinulum lineum and B. vittatum, several different Chitons including the 'butterflies', as well as numerous shells which have been appropriated by hermit crabs. These animals seem to be particularly fond of Cominella quoyana, Trichosirius ornatus, Zeatrophon ambiguus and Trichrelenchus sp..

Across a narrow channel from Ti Point is Whangateau Ocean Beach, and at the back of this is Whangateau Harbour, an area of between two and three thousand acres of intertidal sand and mud flats. There are numerous streams from the hills which flow out through here, and the whole place is covered at spring tides, though it is always shallow in many places.

To get to the Ocean Beach from Ti Point one has to go by boat, a dangerous venture if the tide is flowing out and the boat is propelled only by oars, as the current is extremely swift, and eddies and swirls in all directions. I have heard of one drowning fatality here, so make it a rule always to go over just before high tide, and return after low water just after the tide begins to come in again. In this way the current tends to take one into the harbour instead of out to sea. Last November a friend and I went to the Ocean Beach after a good north east 'blow', and we found large quantities of Longimactra elongata cast ashore. With them were many Dari stangeri, Zeatrophon anbiguus, Glycemeris modesta, G. latisostata, Trochus tiaratus, Tawera spissa, Dosinia subrosea, and D. lambata. In addition we found small quantities of Antisolarium egenum, Michrelenchus rufozonus, Epitonium tenellum, E. philippinarium, one Pupa kirki, and one valve of Resania lanceolata.

There were plenty of valves of Panopea zelandica and Notovola novaezelandiae scattered about with a few Amphidesma ventricosum, hordes of empty Zethalia zelandica, with some Alcithoe arabica, Struthiolaria papulosa, and Maurea punctulata. We looked hard for more Pupa kirki, also for Bullinula lineata, but, alas, were unsuccessful. Mr. Powell tells me he has seen a good specimen of Soluzea spiralis which was found cast ashore here, but though to date I have kept my fingers well crossed, I have not had the good fortune to find any more. However, I'm always hoping.

Inside the harbour there is plenty to find. There are, of course, the usual things one would expect to see here, such as Chione stutchburyi, Macomona liliana, Amphidesma australe, Baryspira australis, some Cerithiidae, Cominellidae, and so on. The Cominella glandiformis in many cases are quite pretty, being mostly a light green with purple lines running spirally round the whorls, and a dark brown protoconch; quite a contrast from the dirty purple-brown examples of this disreputable creature that one usually meets with. Other shells I have found here in quantities are Notocorbula zelandica, Baryspira depressa, Terebra tristis, Paratrophon strangei, Mucula hartvigiana, Epitonium tenellum, Solemya parkinsoni; and a few Epitonium philippinarium and Zemyllita stowei. I have seen plenty of Haminoea zelandiae lying round empty, but so far have not found live ones, but perhaps I haven't looked in the right places. I have really not searched here very much yet, so perhaps as time goes on I will find other shells.

Further on, in the mud, are hordes of Amphibola crenata, with some Ophicardelus costellaris. I should have mentioned that the latter are very common at Leigh, living under high tidal stones with Marinula filholi and Potomopyrgus antipodum; the last named seems to be as much at home in salt water as in fresh water streams here.

To the north of Leigh is Cape Rodney, which is very rocky and exposed. So far it has not yielded much but just beyond is Goat Island, inside of which, on the mainland, is Goat Island Beach. This is where I live, and so naturally I have paid most attention to this area. At the island end there is a stretch of gravel sand for about half a mile, then some rocks which extend for about the same distance. This gives way to a small cove which we call Pink Beach, as it is composed of pink shell sand. Then there is a mile of rock and boulders before one comes to another pink beach which is called, locally, Kempt's Beach after the original settlers there. From there the coast is mostly steep cliffs with massive boulders and rock shelves at sea level. This extends for about another mile between Kempts' Beach and the long, exciting, Pakiri Ocean Beach. I will describe this later, so now we shall go back to Goat Island Beach.

The coastline here is very exposed, so one has the choice of good live specimens or else broken ones. I try as far as possible to get mine alive unless it's one I have not found before. Below the Gravel Beach at low water are flat patches of rock, with small stones scattered over them, and some sand. Here I have found Marginella mustelina, M. pygmaea, Thoristella oppressa, Cheilea zelandiae, Nucheforcula reniformis, Zemyilita stowei, Notocorbula zelandica, Cardita broderi, Tawera zelandica, Pholadidea spathulata, Zelithophaga truncata, not to mention Protothaca crassicosta, Paphirus largillierti, Dosinula zelandica, Modiolus areolatus, and Juscelus impactus. Cellana radians occurs in hundreds as well as several other species of limpets. Haliotis iris and H. australis are common under the seaweed, and I have found numerous H. virginea washed ashore, though live ones live in deeper water.

There are numerous smaller shells around these rocks too, examples being: two or three species of Merelina, Maurakia hamiltoni, Estea minor, Zenitrella stephanophora, Pellax huttoni, Neogyraleous sinclairi, Paxula parillus, etc..

Out on the seaweed the Trochidae are well represented by Cantharidus opalus, C. purpuratus, Michrelenchus oliveri, M. dilatatus, Thorista viridis, Cantharidella tessellata, as well as Zediloma aethiops, Z. arida, Z. digna, Z. atrovirens. Z. digna we have recently found on rocks with Z. lugubris, and sometimes an occasional Cavodiloma coracina is found close to the sand, but the species is not common here. Maurea tigris is found at times, and dead shells are often washed ashore, but these are nearly always broken. Maurea punctulata is quite common, but I have never seen M. pellucida here. Fossarina rimata is fairly common at times.

Between the Gravel Beach and Pink Beach I have seen a few broken Charonia capax, as well as Monoplex parthenopeus, and have found several Mayena australasia at low water. One day I found a Cabestaniinorpha exerata washed up, but it was a very old broken one. I also found two Xenophalium labiatum, but they were dead and a bit broken. Sometimes I come across the hybrid species which is a cross between labiatum and collactea. Xenophalium pyrum is more common further up the coast, but is sometimes found here.

The Pink Beach is my favourite hunting ground, as lots of Cantharidella tessellata wash ashore here, and they, in my opinion, are our prettiest shell. I am getting quite a good series of them now, with colours ranging from bright orange to the palest green, as well as bi-coloured ones and those with the true draught board pattern. Some of them are incredibly beautiful.

There are hosts of minute shells to be found in the sand, but it is a long job to sort them out and to identify them. I prefer some of these to many of our larger shells, but they have the drawback of being trying to the eyesight if one examines them too long.

One day I found two Hunditia delicatula which are very pretty, and some Dolicrossea vesca. To date I have found five of the rare Thoristella carnesina, too, but the rarest shells I have found here so far are one each of Philippia lutea, Zelippistes benhami, and Mitra maoria (a damaged one). A friend of mine also found a Mitra here, but it, too, was broken.

Maurea punctulata is quite common at this place, and the Thaisidae are well represented by scalaris, haustrum, and scobina, the latter, of course, continually preying on the oysters. Lepsia haustrum appears to be rather partial

to Lunella smaragda, which occur in large numbers, whereas Modelia granosa is more or less conspicuous by its absence as I have only collected five of them as yet. Of Buccinulum there are quite a number of lineum, vittatum, multilineum, with an occasional robustum washed up from deeper water. Also washed up are Pollax buttoni, Trichosirius inornatus, Liratilia subnodosa, Marginella cairoma, Cellana stellifera, as well as single valves of Spisula aequilateralis, Linatula macria, Divaricella cumingi, and Panopea zelandica, also some smaller valves which I have not yet identified. Last Easter quite a lot of juvenile Longimactra elongata were cast up, but I only found one complete one.

At dead low water mark one finds plenty of Zeatrophon ambiguus, Paratrophon strangei, Axymene corticata, Radiacmea inconspicua, Cellana stellifera, Atalacmea fragilis, and further out are some Emarginula striatula and Gadinalea nivea, but I have not seen them alive yet, though I have collected numbers washed up on the sand. Sometimes an odd Cabestana spengleri is found under a crevice, but they are rare, and seldom attain adult size. On the rocks at each side of the cove are numbers of Mytilus canaliculus; these are also found attached to seaweed which is torn up by the roots whenever there is a storm. I have quite a few Tanea zelandica from here but they are mostly juveniles, and no live ones amongst them.

One rather interesting shell that I found in the sand is a Zedilona lugubris, which, instead of being the usual dull black, is a bright orange-yellow, and is quite pretty. Mr. Powell has examined it and he says that though he has seen albino specimens at times, he has never come across one quite this colour.

Among the stones at high tide are plenty of Marinula filholi with a good range of shades even in live specimens, ranging from pale cream through yellow and orange to bright brown. On top of the rocks are numbers of Notoacmea parviconoidea together with Risellopsis varia which attain a good size here.

At Kempts' Beach there is always a surge, so I have never taken much there, except a few Austrofusus glans, Maurea tigris, M. punctulata, and one or two empty Alcithoe arabica, and the Xenophalium hybrid species. I think the best way to gather shells here will be from a dinghy.

Pakiri Ocean Beach is always an interesting place as one never knows what will be found washed up there. It extends north for about four miles or more to Te Arai Point, but I have never been as far as that yet. About a third of the way along a tidal creek emerges, and in the lagoon are plenty of Cominella glandiformis, Amphibola crenata, Amphidesma australe, very large Zeacumantus lutulentus, and in the mud is a species of small brown mussel, much like Volsella fluviatilis, but probably a separate species.

There are numbers of Verconella cast ashore on the beach, some with the animal still inside when I've collected them. I have one V. adusta from here which measures 15 x 8 cm., this is the largest one I have seen, and some V. adusta mandarinoides are almost as large. Sometimes young V. dilatata are cast ashore in the winter, these usually being quite a pretty salmon colour. Those I've found are mostly good specimens with the protoconch intact.

I found two good Tonna maurakiensis there a while ago, and from the numbers of broken ones and fragments lying about I should imagine quite a few come in sometimes. One day I counted about 17 remains over a couple of miles of the beach.

Some of the Pakiri people have found live ones there, after storms. Austrofusus glans is sometimes found, and there are lots of Cominella adspersa at low tide, quite attractive orange brown ones and not stained as is so often the case with this species.

Plenty of empty Astraea heliotropium come ashore here, but they are mostly small ones, and I have not seen any live ones. A few big Cookia sulcata come in at times, but they are more abundant on the rocks to the south of Pakiri.

The other day I found a broken Maurea cunninghami, but that's the only one I've seen here. Monoplex parthenopeus is often washed ashore, but usually empty, and with most of the epidermis gone. I think these are mostly ones which have been inhabited by hermit crabs, and sometimes the creatures are still in the shells. Cabestana spengleri and Mayena australasia are often found on the sand, the latter being of a lighter brown and more nodulous than those I've collected amongst the rocks. To date I have also found two Argobuccinum tumidum, one of which is a very good specimen, but the other is broken.

Zethalia zelandica is the most common univalve at Pakiri, and at low tide one finds numbers of Baryspira australis with hermit crabs living in them. Struthiolaria papulosa is common, some being juveniles which are almost transparent and very fragile, while S. vermis is occasionally found too, some being quite large. At low tide one can scoop up handfuls of small shells in the surf, but there is usually nothing of much interest there. One day I found a couple of Epitonium shells which I think are E. bucknilli, but am not sure. E. jukesianum is quite common.

Sometimes Xenophalium pyrum is found, often freshly empty, and some have very pronounced varicies upon the outer whorls. One day I found one broken one which must have measured four inches when intact - quite a giant. I have not so far come across live specimens, but have hopes of dredging in front of the beach some day, so should get some then.

Of bivalves one comes across numerous Atrina zelandica cast ashore, with Dosinia anus and D. subrosea, including perfect juvenile specimens of the latter. Twice I have found Bassina yatei, but they are scarce, so is Chione stutchburyi. Tawera spissa is more common, but not always complete. Plenty of single valves of Panopea zelandica are scattered about, so also are Notovola, but they are quite uncommon as complete specimens. Once I found two valves of Mactra ovata, and at times one sees broken Longimactra elongata.

One day I found half of an Amphidesma ventricosum, but I happened to remark on this to one of the Pakiri residents who informed me that some shells were introduced there a few years ago in an effort to establish them there. Evidently this venture was unsuccessful, and it is presumed that they all died, which seems a reasonable supposition. No doubt the location is quite unsuitable for the toheroa. One of the most common of all shells here is Amphidesma subtriangulatum, which is a favourite food of the local Maori folk, not to mention Pakehas, including myself. On the sandhills at the back of the beach are places where large patches of tuatua shells are still to be seen. They evidently constituted the main Maori diet in days gone by.

Odd valves of Spisula aequilateralis are common, but I have yet to find them alive; these appear to be the only form of Mactra much in evidence. Some are quite big ones.

It will be seen from the foregoing notes that there is plenty of scope for collectors here at Leigh. Needless to say, I have not mentioned all the shells I've collected here, as it would take a long time; probably I will subsequently find other species as I've only been collecting here for just over a year. Anyhow this description will give you some indication of what this place is like for collecting.

T. P. WARREN

GLOCHIDIA OF HYDRIDELLA AT MT. ST. JOHN

While on a visit to Mt. St. John, Auckland, in search of lizards and beetles for my school children, I investigated the crater pond, which contained about six inches of very green water. Apart from water fleas, boatmen and mosquito larvae, I noted many greeny white specks moving about in the water.

Upon examining them more closely I found that they were small shellfish. I collected a great number and took them home for observation.

Under the microscope they proved to be transparent horny bivalves, which lacked, in the smaller specimens, any form of calciferous hardening. The animal was found to move about by waving a long flagellum and opening and closing the valves.

Quite a number died within a week, but the remainder quickly doubled their size till they reached approximately 3 mms. in length. The bigger shells soon became opaque and settled to the aquarium floor, where they died, largely, I believe, through too sandy conditions and subsequent food shortage.

They were undoubtedly glochidia of Hydridella, which had been carried to this pool by seagulls. This theory was confirmed on finding the same at the Sir John Logan Campbell statue pool.

It may be of interest to investigate these pools this year in the hope that the shellfish may be observed more fully.

E. S. RICHARDSON

ADAPTATION TO ENVIRONMENT

Everyone knows that the common garden snail Helix adspersa has adapted itself to many types of climate. Even our own native snails appear to possess some ability to adapt themselves to a changing environment. This is very noticeable at Makarori Headland, a few miles north of Gisborne, where, originally, bush probably clothed the hillside. Now it is grass covered and edged with a few flax bushes.

The bleached shells of several species of snails - Therasia sp., Charopa coma, Fectola sp., and Phenacohelix sp., were found below the bank, and investigation of the flax-bushes, together with the sparse grass surrounding them, showed that the snails were living there in considerable numbers. Conditions just then were very dry, and some snails appeared to be hibernating while others, endeavouring to find a damp spot, were being caught in the grass and hot sand of an old dune between the flax-bushes. Usually these snails are found among damp, decaying leaves in the bush, and will not live long in dry conditions; however, in this case they have managed to adapt themselves, after the felling of the bush, to a very rigorous existence.

N. W. GARDNER

SHELL COLLECTING AT NEW PLYMOUTH

The Taranaki coastline has a poor reputation with shell collectors.

This summer, 1949, for reasons of reviving past associations and to introduce my wife to the beauties of Taranaki scenery, New Plymouth claimed our attention.

A glance at the map shows the New Plymouth headland, Nikotahi, with its rocky islets, the sweep of beaches to the north, and to the south beyond, the sugar-loaf hill, Paritutu.

Our preliminary search along the Fitzroy beach northwards revealed very little. Bivalve wash-ups that are a feature of most other beaches were missing here. A half valve Amphidesma subtriangulatum or Arca novaezelandiae, and at the first river mouth some two miles on beds of Chione stutchburyi were all to be seen.

A few large rocks on the beach revealed at low tide were covered with the small mussel Modiolus neozelanicus and, of course, with them the small limpet Notoacmea helmsi. These latter were interesting for their large size and clean, well defined marking. Some had the lines running to the apex and others had the usual cap. They were not plentiful. Cavodilora coracina were plentiful with large size and beautiful colouring. Here also we found the Paratrophon exsculptus, the Taranaki form, and Siphonaria zelandica. Nearer to the town and just north of the port is Ngamutu beach, which was very disappointing, with not a shell trace.

The rocky headland of Nikotahi is difficult of access except at very low tide, but Horseshoe Bay alongside it to the south is a mass of boulders and there, at least, we hoped for luck. Exsculptus were there in plenty at low tide but surprisingly few Cellana radians or ornata. A good specimen of Stellifera phymatius was found and one Adusta mandarinoides in good condition considering the rocky nature of the place. We saw a few Maurea punctulata, Neothais, Lepsia and Lepsiella, but nothing more exciting before the tide gained. The beaches at New Plymouth not being very helpful we decided to go further south, to Opunake. There we found the coast to be high cliffs and Opunake Beach a mile-wide bay of uninviting looking iron sand. However, on the headland to the north was a long jetty of very large boulders, and there we hoped for some finds. But again we were disappointed. A few Cellana radians and ornata and the inevitable haustrum and scalaris. Crayfish were there and octopus which dampened our enthusiasm somewhat for that locality.

Opunake gave us nothing for our collection, but the view of Mt. Egmont was grand and the countryside really beautiful.

Of course we had to go to Mt. Egmont and wondered if we should find any land shells. We had an hour or two in the bush at the hostel and found one of the Flammulinidae that we have yet to identify. For all our meagre find with shells there we were entranced with the bush. The growth of the rain forest is amazing and well worth the trip. Most interesting to us was the "elastic palm", Cordyline indivisa, which has the appearance of a flax bush on a high stem.

Towards the end of our stay at New Plymouth we determined to search Horseshoe Bay again. We took a number of Exsculptus for club members and then came our great surprise. In a narrow runnel in a pool we found a number of live Epitonium jukesianum. These were the first that we had seen alive, and so vindicated to some extent our opinion - from the shell collector's point of view - of New Plymouth.

ROBERT L. MATTHEWS

A TRIP TO AN OAMARU BEACH

Winter is not an ideal time for holidaying, expecially if one is shell collecting.

Kakanui Village is situated eight miles south along the coast road from Oamaru. There is an ideal rocky collecting ground at the mouth of the Kakanui River and extending about a mile southwards. Then further south is the beautiful wide sweep of Campbells Bay.

On the rocks at Kakanui I found Mytilus planulatus, Aulacomya maoriana, Prothothaca crassicosta (from which good soup was made) Lepsiella scobina albomarginata, Lepsithais lacunosus and Patatrephon pateus in plenty. One remarkable feature was what appeared to be occasional albino specimens of Mytilus planulatus.

At low tide some good specimens of the Buccinulum family were taken. Very clean Azymene corticata and a Trichosirius ornatus were also added to our collection.

A new experience was to set off shelling armed with a tomahawk. This enabled us to attack the roots of the giant -p. In these roots are Microlenchus oliveri cryptus and Margarella decepta. These species are very active when disturbed and one needs to cut through the kelp quickly or the specimens drop into the surf.

Interesting also were the limpets Cellana radians perana, Cellana rediniculum, Pileopsis sturnus and Benhamina obliquata. These were all fairly plentiful.

On one occasion whilst absorbed in shelling I heard a gruff bark behind me. At first I took no notice, but on turning later found to my consternation a large seal coming towards me. My sister, who is used to this locality, laughed, for apparently these animals are a feature of the southern coasts.

Two finds washed ashore on the sandy beach at Campbells Bay were several slit limpets in quite good condition and several half valves of what looked like an Arca. These latter were exceptionally heavy valves and strongly beaked. They have been identified as fossils.

At the northern end of Campbells Bay is a fossil bed. This is well above high tide and contains specimens of brachiopods, not easy to get out, and the axe was here again most useful.

I found the Kakanui area ideal for shell specimens. However, compared with Auckland it is too cold to make collecting pleasureable.

W. J. MATTHEWS

TERRESTRIAL MOLLUSCS COLLECTED ON ISLANDS IN THE HAURAKI GULF, 1948

Home Bay, Motutapu Island:

Land: Laoma poecilosticta, Paralaoma lateumbilicata

Fresh water: Potamopyrgus antipodum, P. antipodum zealandiae, P. corolla, P. ~~spaelus~~ spelaeus

Onetangi, Waiheke Island:

Land: Rhytida greenwoodi (with and without dark umbilicus) Liarea egea, Therasia dosidua, Laoma poecilosticta, Phrixgnathus ariel, Rocella cogitata, Ptychodon hunuaensis, Phenacohelix ponsonbyi.

Fresh water: Isadora sp., Potamopyrgus antipodum, P. coralla, Hyridella menziesi aucklandica?

N. W. GARDNER

TRAWLING.

Some of my fellow members in the Club may like to know what happens when one goes to sea on a fishing trawler, and hunts for some of our deep sea specimens. During the past two years I have been fortunate enough to have had the privelege of being invited by Frank, the Skipper of the Vanguard, to be on his boat, so thought it may be of interest to members to give them some idea of what takes place.

As the trips are similar and only the area varies I propose to deal with my last trawl which took place in February this year.

The trawler carries a crew of four including the skipper and on this trip one of the crew was absent, so I occupied his bunk, and that made the trip much more comfortable. If I am on board when the trawler has a full crew I manage to get ' 40 winks ' in the wheelhouse.

We left Tauranga at about 4 p.m. and made our first stop by Whale Island which we reached at 9.30 p.m. Here we anchored until 1.30 a.m. then set off again to be on the fishing grounds on the Tauranga side of Cape Runaway by sunrise.

As soon as the trawler is set on a particular landmark the nets are "shot" and the speed reduced to about four knots and the nets are down for about two hours. On this particular boat the ' gallows ' are at either end of the stern, through which the trawling wires pass and are attached to the boards and nets. It may be helpful if I explain that the boards are set at an angle and when being trawled spread out the wings of the net and any fish which come between these boards are automatically thrown into the ' cod net ' at the end. There is a regulation which governs the size of the mesh in the cod net which allows any fish under size to pass through and will give some idea of the number of small shell one loses unless he has some particular gear attachment to collect the specimens from the seabed.

The writer is very much indebted to Mr. A. W. B. Powell who gave some good plans of a particular dredge to be used for shells. This was constructed and used once when, unfortunately, it became damaged. Another I am glad to say is in the course of construction.

After the nets have been down some two hours the engine is put to neutral and the nets begin to be hauled in. The first to appear are the boards and they are secured to the gallows, the wires released, and they continue to haul the nets. A fair amount of the fish are usually hung up in the wings of the net and these are brought aboard by hand. When I am aboard I am usually handy and sometimes secure specimens of Verconella (austrosipho) which have also been hung up and these are generally large specimens. All the fish are now in the cod net and this is brought aside and hauled aboard by the winch, the fish then being released on to the deck. The sorting and icing down begins and whilst this is taking place I am usually examining the boards and nets for any small specimens and in this way I have obtained quite a few good specimens, some of which I enumerate.

Zeacolpus vittatus, Zeacolpus pagodus,
Z acolpus mixtus, Phenatoma ,
Aoteadrillia wanganuiensis chordata,
Anntinolatoma n. sp., Uberella vitrea,
Baryspira novazelandiae, Nusula stangeri,
Nucula n.sp. , Nuculana bellula and
Pleuromeris zelandica.

I dont want my readers to think that each time a trawl of fish is brought up there are always shells with it - that sometimes depends on the area one is trawling in - on this last trip of mine I was away nearly a week and the total number of Verconellas I secured was about 18. Small ones I usually put back to give them another chance.

It is only when one is on a trawler that he can really understand what hard work our fishermen have when at sea . I earlier mentioned we left port at 4 p.m. and except for a pause for some 3 hours , 21 hours work was put in , solid work from sunrise to sundown . After each trawl the nets have to be examined and mended . This is usually a big order if sharks have been in the nets , or they have dragged on a rough sea-bed.

Frank the Skipper, and my particular friend , is also a good friend to Conchology and at sea we are usually trawling on the same grounds as the Auckland boats . They all seem to want to help in saving shells for our members who are interested , but they object , and quite rightly , if the shells are collected for sale . It is known that this has happened but not by our Club members, and as one put it to me " We trawl the shells and someone profits by it. "

For me, trawling for shells is a hobby , and in being at sea for a spell of five or six days, I find great interest and study . It is not always calm at sea but I would advise any member to try a trip if opportunity offers . My object is not to hoard shells but to pass on to others members who are interested , and I will do my best to help with trawled specimens for the Club and Museum .

Verconellas (Austrosipho) are of special interest and I find they vary a lot . I should like to place on record the wonderful help and assistance I have had from our Patron , Mr. A.W.B.Powell , in identifying so many trawled specimens which have given me some headaches .

To conclude it may be of interest to readers to give a list of some of the specimens I have trawled . My best areas so far have been Bay of Plenty between Mount Maunganui , Motiti Island and Whale Island . Depths vary from 30 to 100 fathoms and in the past two years I have added to my trays:-

Verconella (Austrosipho) dilatata, dilatata ... cuvieriana, elongata, ormesi, adusta and adusta mandarinoides.
Aenator compta and marshalli. Pallium convexus.
Alcithoe arabica, fusus, jaculoides, johnsoni, and swainsoni . Ranella multinodosa .
Poireiria zelandica . Charonia capax eucliodes.
Atrina zelandica . Tonna haurakiensis .
Dentalium nanum. Fissidentalium zelandicum.
Astrea heliotropium . Xenophora neozelanica .
Murexsul cuvierensis and octogonus . Mayena n.sp.

These are only a few which come to mind but it will give reader some idea of what can be secured from trawls, and when I get the proper gear I hope to do better .

A. S. VOSS.

An interesting find amongst the plentiful, sub-fossil land mollusca strewn on the sand dunes at Cape Maria Van Diemen, Dec. 1947, was a specimen of Rhytida duplicata containing six eggs.

N.W.GARDNER.

SOME OF OUR [illegible] AND SNAILS.

1. Liarea carinella. Pfr.
2. Liarea egea. Gray.
3. Murdochia pallida. Hutton.
4. Hydrocena purchasi. Pfr.
5. Laoma leimonias. Gray.
6. Laoma poecilosticta. Pfr.
7. Phrixgnathus origona. Gray.
8. Phrixgnathus marine. Gray.
9. Ptychodon pseudoleioda. Sm
10. Ipestula egest[illegible] Gr[illegible]

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BULLETIN No, 5 AUCKLAND, NEW ZEALAND

AUCKLAND MUSEUM CONCHOLOGY CLUB

BULLETIN NO.5

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PREFACE

Articles in No.5 Bulletin have again been contributed by our Club Members, and interesting accounts of some of their collecting activities during the year have been recorded here.

An exceptionally wet winter has prevented any Club field days, but Labour Day, the lowest tide for the year, proved fine, and there was a good muster for what proved a fair day's collecting at Rangitoto Island.

The membership of the Club is growing, and now numbers 70 members.

All plates in Bulletin No.5 were cut and hand printed by Mr. N. W. Gardner.

We wish to thank Mr. A.W.B. Powell for his continual help and encouragement to the Club, and Miss P. Boyd who once again has cheerfully shouldered the job of cutting the stencils and running off the Bulletin copies for us.

E. N. GARDNER

Hon. Editor

THERASIA

* DECIDUA,

Small Land Snail.

GOULAND DOWNS TRIP

During March 1949 I managed to get a guide with a pack horse to go on a hunt for Paryphanta on the Gouland Downs, between Collingwood and Karamea, North West Nelson.

The first day we got as far as the Brown River Hut and the following day started to wind through the gorge leading to Perry Pass. We found the track had been so neglected that it was well over-grown, and several trees which had fallen over the track had to be chopped and rolled out of the way. The horse was very quiet and it was wonderful how with its heavy load it could walk over rough boulders in the rivers. To me, in some places, it looked impossible.

We put up our tent in bush at 3000' about two miles before reaching Perry Pass. Light rain fell that evening. Next day while packing we had a bell-bird close by. I whistled to imitate their call, and in a short time we had twelve bell birds around us. We came on to Perry Pass, where the mile pegs start, and went on to the four-mile peg which is at the Gouland Down Hut. There we stayed the night with three other men who were travelling in the opposite direction. When passing the two mile peg I picked up on the track one empty Paryphanta superba richardsoni.

Our fourth day out we arrived at the 11-mile peg. The track was overgrown with high tussock grass, wet with rain, and we were well wet up to the 'middle'. Several more fallen trees had to be cut off the track - we were two hours clearing a slip enough to get the horse over, and had to unpack and carry the gear over the slip. Our tools for the job were saplings, pointed chisel fashion. We put up our tent, made a good fire to dry our clothes as best we could, and the following day moved on to the 15 mile peg. When we arrived it was raining and everything and everywhere sopping wet. We put up our tent on the site of a roadman's camp, where the six foot slab walled fireplace enclosure was still standing. My guide here in the wilderness unearthed two seven foot sheets of iron which he put for shelter over the fireplace. What a relief to have a place to dry our clothes in this outlandish place!

Well! Here was our starting point to hunt for Paryphanta and we planned to stop at various places on our way back. We had tramped 23 miles to this spot. Dirty weather set in and for six days we had rain, hail and wind. Nearby ranges were covered with snow and owing to the bad weather we were unable to do much hunting. We found about 35 shells - Superba type - a variety new to me and mostly small and damaged. We were sorry to leave here, but had to consider our food and the rivers to be crossed on the way back. We returned to the 11-mile peg and along the way found a few shells similar to those at the 15-mile peg. We also saw a large live kiwi, a grey bird. Every night while we were on the Downs, at each camp, we could hear the kiwi calls. The birds appear to be plentiful. We passed through the area where P. jamesoni is found - Saxton Stream and Gouland Down hut area, between 4-mile and 10-mile pegs. The weather was so unsettled that we were afraid to stay, so made our way to the 2-mile peg near Perry Pass. It was raining when we arrived and three days were spent waiting for fine weather. We collected approximately 40 shells - P. superba richardsoni. It was a good hunting ground here, but the weather was against us - one morning we had six inches of hail around our tent. The sun broke through at 10 a.m., so we were able to do some collecting. At one place in the bush the trees were tall and slender and the ground bare except for a few ferns on the side of a camp area. Dead shells were lying about, presenting

altogether a weird sight.

We decided to get off the track before our food ran out, so made a long journey to the Brown River hut. It was dark when we arrived after twice having had to unpack to get the horse under large fallen logs. We were very tired and rested in bed till mid-day, then made our way to the car.

We were away 17 days, tramped 62 miles with wet feet most of the time, slept in sleeping bags on sopping wet ground, chopped off the track 12 trees 8" - 18" in diameter, and cleared away one slip - altogether a hard trip with very little reward, but plenty of "thrills and spills".

ARTHUR RICHARDSON

A COLLECTING TRIP OF MANY YEARS AGO

Fitzroy, Great Barrier Island, is a rather unusual, and from many points of view, an interesting spot. There gannets breed, shags nest, and even the lowly earthworm is of outstanding size.

The waters of the landlocked harbour abound with fish of many varieties. Dotted about are islets on which pohutukawas grow to the edge and display their brilliant red blossoms in contrast to the water - that vivid blue water which vies with the blue of the sky in intensity of colour - that water which is clear and deep and in which the tracery of the seaweed is comparable with, and looks as lovely as a bed of delicate ferns. Here creatures, fish, penguins, shellfish, etc., can be clearly seen as they move about.

There are not many beaches around the harbour as the country is hilly and, in most parts, rises steeply above the water's edge. At one end of the Port is the home where Joe Paddison Jr. lived with his family. This is my starting point.

There is a small wharf at the landing and from this the tide recedes exposing some muddy beach. Just beyond, a stream runs into the harbour and at the mouth of this stream could be gathered Melanopsis trifasciata, Potamopyrgus antipodum and Latia neritoides. On rocks high up beside the wharf there were Taron dubius and near by Arca novaezelandiae, Mytilus planulatus and good Maoricrypta costata, while from an old kettle I took excellent specimens of Sigapatella novaezelandiae.

On rocks across the harbour are fine Lepsiella scobina these being well grown as a result of living on a diet of luscious oysters and for which at that time the Government was paying 1/- per thousand. It was noticeable that where these fish were found on the beaches at spots where fresh water ran down to the sea, they, the Scobina, were smaller than those living on the rocks and were golden lined. Could there be any connection between the fresh water and the colour of the interior of the shell? Also across the harbour, on a boulder beach were found the delicate little Atalacmea fragilis and on a high rock large Cellana stellifera.

At Nagle Cove were found Amphidesma australis, Leptomya retiaria and Maurea tigris and punctulata. There, also, are found Chlamys zelandiae in rich brown shades and the somewhat rare C. zealandonus and C. consociata. Walking along the beach I kept a watch for Tonna haurakiensis, but did not find any. However, a companion on

going a short distance in the opposite direction picked up two, one of which was alive.

At different parts of the harbour I gathered Hiatella australis, Pleuromeris zelandica, Cardita aoteana, Volsella arcolatus, Trichomusculus barbatus, Cleidothaerus maorianus, Mayena australasia, Marginella mustelina, Axymene corticata, Daphnella cancellata, Solarhaphe olivori, Buccinulum vittatum, Anisodiloma lugubris, Notoacmea daedala, Haliotis australis, and Notocorbula zelandica. The last named was taken from fish.

Large chitons crawl over the rocks, but not being really interested in Cryptoconchidae, those which I gathered were passed on to another collector.

In spite of being constantly on the lookout for Monoplex exaratum, I was unable to find any.

On the whole I thought and still consider the results were satisfactory both from the point of view of a collector and that of one who in addition to gathering shells, saw many things of unforgettable beauty.

A. M. Gillman

"A MERRY CHRISTMAS"

The above words, given as a greeting, are perhaps not quite as frequently used in these times as they were fully a quarter of a century ago, and certainly could not be given with the same confidence as then, for in a world that has failed to recover from the effects of two great wars - shaking civilisation's very foundations - there can hardly be the same certainty of realisation as then. However, these same words, given the simple meaning of 'a pleasant and happy Christmas', can very well describe the experience of the conchologist who goes on holiday at that time of the year, leaving behind all business cares, letting the rest of the world go it's own way, while he pursues his interesting hobby.

Christmas Eve 1948 found the writer arriving, by invitation, at the home of a farmer friend in North Auckland, having set out with the intention of discovering what the district might yield in the way of land snails.

My friend's farm is situated at Titoki, a country district some 17 miles west and north of Whangarei. I had previously visited the district several times, spending but a few hours on each occasion, usually viewing the well-known Wairua Falls (the Niagara of New Zealand), and the Electric Power Station which is situated there.

On one visit, straying from the path which leads to the foot of the falls, I found, in the bush under some decaying vegetation, two specimens of Phenacohelix ponsonbyi. I knew, therefore, that I should get some return for my searchings.

My great ambition was to find Paryphanta busbyi alive, and the first evening found us discussing over the dinner table the prospects of realising this ambition. My delight can be imagined when a young son of the family told me he knew where some should be found.

This young man, who was a pupil of the local District High School, had gone with a party from his class to the near-by Houto Mountain in search of these snails, and they had been

successful in finding one live specimen and two or three spent shells. To keep the live specimen under observation at the school they employed the novel idea of tethering the snail to a stick. This they did by piercing a small hole near the lip of the aperture, and using a piece of string for the tether; no doubt selecting a suitable spot for the experiment.

Christmas Day, therefore, saw us setting out for Houto Mountain, a bush-capped, isolated cone rising 1800 feet above sea level, though possibly only half that height from the surrounding country. There was only one way to reach our objective - the bush near the summit - especially as time was a consideration, that was to climb straight up the very steep slope of this cone. Any attempt to ease the climb only added to the distance travelled without increasing the altitude. After several rest spells my friend and I finally reached the bush and began our search.

We very quickly came across a likely looking area where there was a thick matting of dead leaves covering the ground, broken only by an out-crop of rock. The foot-hold was rather precarious on the steep slope, but, working round at the foot of the rock face, raking through the leaves and searching the crevasses under the rock, I very soon came across a dead P. busbyi shell. This naturally acted as a tonic, and within minutes several live specimens and a few dead shells were 'in the bag'. At this spot I also unearthed a nest of eggs in some loose dry soil in a crevasse under the rock. Working round a little further in this area we came across another small colony and another nest of eggs.

Having securely packed the 'haul', we proceeded to search further afield, climbing higher and working round below the summit, but without success, except for two dead specimens of Serpho kivi.

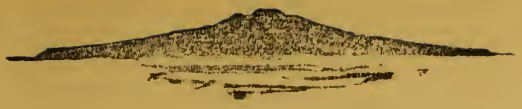
That evening, back at the homestead, I tried to make my catch feel at home in a shoe box, having brought back from the bush a quantity of dead leaves and soil etc. One thing I did not manage to do that evening was to find something for the snails to eat, and I imagine they were inclined to think it was anything but 'a Merry Christmas' for them; however, they made the best of a bad situation, for, during the night, they broached three of the eggs.

Next morning, the young man of the house, displaying a knowledge which indicates a 'budding naturalist', came to light with a handful of earth worms from the cow yard. These seemed to be very much to the liking of the snails, who showed their appreciation by laying three eggs the second night and so restored the nest to its original count.

The afternoon of Boxing Day was spent in the stretch of bush between Wairua Falls and the Power Station; however, specimens were very hard to find, the total comprising just two or three each of Serpho kivi, Laoma sciadium and Liarea (possibly turriculata). The river itself yielded Potamopyrgus corolla, Latia neritoides and Hyridella lutulentus.

Had my stay been of longer duration it is quite possible more could have been found in the district by going further afield, say up the Mangakahia Valley, but a prearranged programme did not permit of this. However, before leaving Titoki a visit was made to a beauty spot in the district, one which should not be missed by anyone on a sight-seeing trip in the north. This is a natural rock bridge situated about two miles out on the road toward Aponga. Though not given the publicity of the famous Wairua Falls, this natural formation is well worth a visit, access to it being quite easy. My short stay coming to an end, Titoki was left behind with some regret for I had enjoyed wonderful hospitality and experienced a most 'pleasant and happy Christmas'.

Wm. P. THOMSON



THE NATIVE LAND SNAILS OF RANGITOTO ISLAND

The origin, distribution and ecology of small native land snails found on Rangitoto Island present several interesting features, especially in relation to the development of the vegetation.

It is assumed that the snails came first to the Islington Bay area from Motutapu at a time when the two islands were in some manner bridged or connected. For instance the lava of Rangitoto during eruption, could have flowed up against the shores of Motutapu, forming a link over which fauna could travel when conditions eventually became favourable.

Motutapu, which was bushclad until about 1858, probably supported quite a large number of species, but since the clearing of the island, the ground beneath the few remaining groups of trees has become so trampled by stock that native snails have disappeared with the exception of one or two species found existing under very rigorous conditions on the coast, half a mile north of Home Bay.

The physical features and the varying stages of vegetation have had a very marked influence on the present distribution of land molluscs on Rangitoto. The island, which is approximately circular, and about three and a half miles in diameter, consists of lava flows surmounted by a small scoria cone. The general opinion seems to be that no volcanic activity has taken place on the island for several thousand years. There is no evidence to show the rate of weathering of basaltic lava, and although the flows for the most part show few signs of breaking down, it is thought that the age of the island is considerably greater than the apparent youth of the vegetation might lead one to believe.

Lichens and a few mosses would, most likely, be the first to appear, and the humus formed by them, together with the weathering of the rocks, would eventually enable the wind and bird borne seeds of hardy higher plants to gain a foothold. For a considerable period plant life would not flourish on the porous lava during the hot dry summers.

According to visitors to the island at about 1890, the vegetation on Rangitoto was fairly scrubby and the trees so short that it was difficult to find one which afforded reasonable shade. In the last sixty years, however, conditions have improved to such an extent that in many places trees, particularly pohutukawa, have reached mature size. Mosses and lichens abound on the island, and amongst the loose blocks of lava groups of pohutukawa, Griselinia lucida (puka), Suttonia australis (matipo) and Astelia banksii are now flourishing, together with kidney ferns and other small plants according to the amount of shade offered. The vegetation is fairly continuous in most parts, but in one or two places where the lava fields seem younger, i.e. less weathered, it is very scattered, e.g. in the vicinity of the track from the summit to McKenzie Bay. The most favourable conditions occur about the base of the cone in the ash belt, where trees appear to have grown without interruption. On the other hand

those towards the coast often seem to have been stunted and gnarled for a time but later to have grown quite well.

At the time when the fauna is presumed to have arrived from Motutapu there must have been enough leaf mould, at least about Islington Bay, to support a considerable colony of native snails. They are found amongst damp leaf mould and cannot survive for more than a week or two in dry conditions. The eggs are laid in spring and early summer among decaying vegetation in places that must be continually damp. Incidently, they die very quickly in salt water so that the possibility of the snails reaching Rangitoto by floating on debris across the narrow stretch of water now separating the two islands, is remote.

Text continued overleaf...

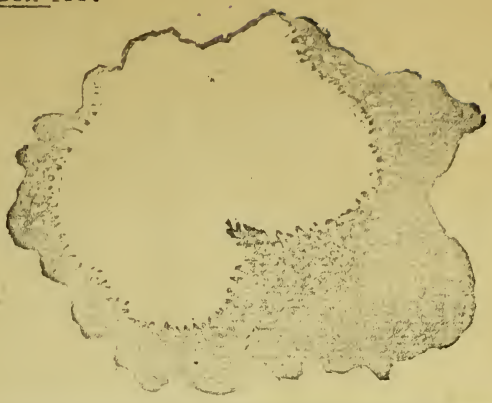
Probable origin and route of distribution of snails.

RANGITOTO ISLAND.

Distribution of :-

Plate I.

THERASIA DECIDUA Pfr.



MOCELLA COGITATA Iredale .

PHENACOHELIX PONSONBYI. Suter

Snails have been collected from many localities on Rangitoto Island, the species being as follows:

Otoconcha dimidiata (Pfr. 1853)
Therasia tamora (Hutton, 1883)
Therasia decidua (Pfr. 1857)
Phenacohelix ponsonbyi (Suter, 1890)
Flammulina costulata parva (Suter, 1909)
Flammulina perdita (Hutton, 1883)
Ptychodon hunuaensis (Suter, 1894)
Charopa coma (Gray, 1843)
Fectola buccinella (Reeve, 1852)
Subfectola caputspinulae (Reeve, 1852)
Rocella cogitata (Iredale, 1941)
Laoma poecilosticta (Prfr. 1853)
Laoma ariel (Hutton, 1883)
Paralaoma latcumbilicata (Suter, 1890)
Delos coresia (Gray, 1850)

Of these Therasia decidua has previously been recorded from the island (See T.N.Z.I. Volume 69).

Although Lirea egea was reported to have been taken from near the base of the cone in 1886, there was no sign of this species during present investigations.

Those snails most widely distributed are Ptychodon hunuaensis, Subfectola caputspinulae and Rocella cogitata. All are very small species seldom exceeding 3 mm. when fully adult.

Ptychodon hunuaensis was probably the first snail to gain a good foothold on Rangitoto, as it is the only one that has completed the "invasion", being fairly evenly distributed over the whole island. The small amount of humus available at first would be sufficient to enable this species to move inland at an early stage. Larger species would be handicapped, as more food and shelter would be needed and it would be some time before a fairly continuous layer accumulated beyond the fringe of Islington Bay to give the other species a 'boost', and enable them to increase their range. As the vegetation became more firmly established and therefore suitable for the other species, the snails may have invaded in a series of 'waves' (see distributional maps) possibly in the following order:

Species	Stages of vegetation
Ptychodon hunuaensis	Decayed mosses, lichens. Very few higher plants.
Rocella) Fectola)	Small copses and small amounts of leaf mould.
Laoma) Therasia) Charopa)	Vegetation fairly continuous. Considerable shade, reasonable amounts of leaf mould.
Laoma poecilosticta) Delos coresia)	Continuous vegetation areas that would remain damp.

The part between the coastal vegetation and the base of the cone, has a sparse distribution of snails. It is a region of large lava fields with few areas through which only the hardy types have been able to infiltrate. Such an area occurs directly inland from Rangitoto Wharf, and this would appear to be the route by which Ptychodon eventually reached the cone, where snail life appears to be restricted to the southern side.

It is interesting to note that one or two varieties are now found in almost every copse on Rangitoto, and in spite of the apparently insurmountable bare lava fields, are to be found even in small 'islands' of vegetation surrounded by lava for at least twenty feet. The explanation as to their presence gives an answer to the problem of how such small snails could make their way to all parts of this rugged island.

During the six wet months of the year the snails venture out from leaf mould under trees, and travel as much as twenty feet through the loose rocks. In October, among the lava, often twelve feet from a copse, specimens of those snails most widely distributed on the island were found living in small amounts of decaying mosses and lichens which had collected from eight inches to one foot below the surface.

Possibility of the snails having been dispersed by wind blown leaves is most unlikely as the requirement is dampness and only dry leaves would blow about. Even these would go only a short distance before they dropped down into crevices in the lava. If the wind was the main agent of dispersal the snails would have spread out towards the east and south carried by the prevailing wind. Distributional maps show that this is not the case, colonization having taken place from east to west.

The largest concentration of snails is about Islington Bay, as would be expected, and some of the varieties occur in this vicinity only - notably Laoma poecilosticta and Delos coresia. Some of the area occupied by the former species appears to have been burnt off at some time and, though this would check them temporarily, it would not completely destroy all specimens in that particular area. The ash from the burnt vegetation would produce an amount of fine soil capable of holding moisture for some time. This may account for the large local populations of frequently as many as 35 to 40 specimens to the square yard, particularly in hollows where traces of ash are evident.

While most of the species appear to have spread out from Islington Bay, such does not seem to be the case with Therasia tamora. This variety occurs in a very restricted area of a few chains, on the west side of the island near the lighthouse. The colony is of considerable density and exceeds the numerical strength of all other species in the vicinity. In this case the eggs or even the adult snails could have been transported to the island by human agency, as the area occupied by them supports a considerable number of exotic plants.

By far the most active snail on the island is Therasia decidua, which was observed negotiating the edges of lava fields, particularly in damp weather. This species, the largest found on the island, appears to travel very near the surface as, out in the open, it always seems to occur just under the surface rocks. The active nature of this snail has enabled it to travel to most parts of the island.

Review of some of the other species:

Fectola buccinella:

Specimens from Rangitoto settlement and nearby areas are quite normal in colour and markings, but near the 'Wrecks' at Boulder Bay the same shell is pale and almost devoid of markings.

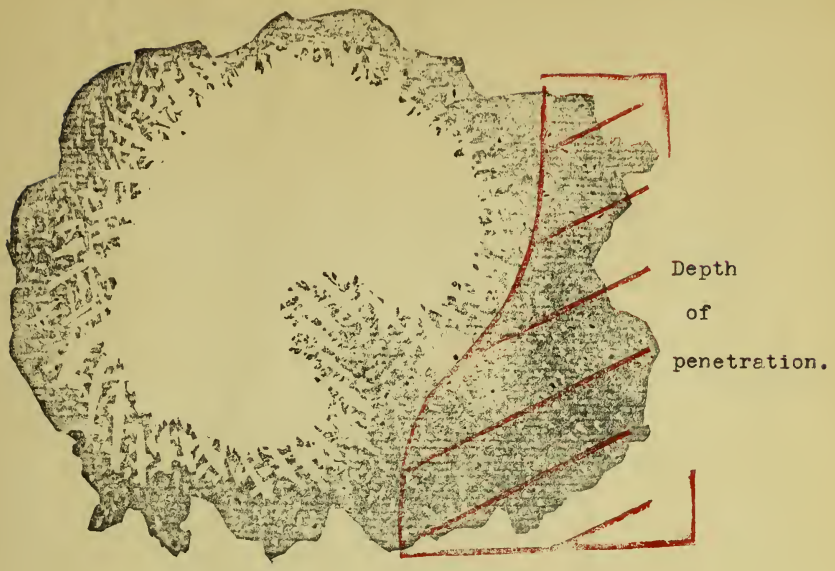
Phenacohelix ponsonbyi:

Is rather scarce and seldom taken alive. It seems that this mollusc is not particularly 'at

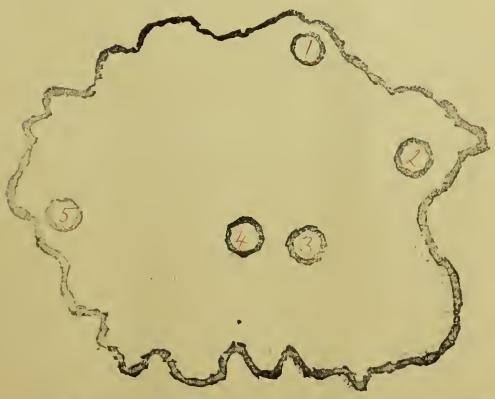
RANCITOTO ISLAND

Plate II.

DISTRIBUTION OF SPECIES :



BLACK : Ptychodon hunuaensis , Suter.
RED : Laoma poecilosticta , Pfr.



1. Flammulina costulata parva, Suter.
2. Delos coresia , Gray.
3. Otoconcha dimidiata , Pfr.
4. Flammulina perdita , Hutton.
5. Therasia tamora, Hutton.

home' on Rangitoto.

Flammulina perdita, F. costulata parva:
Appear to exist in tiny isolated colonies and are smaller than the mainland equivalents.

Otoconcha dimidiata:
Of this shell one specimen only was found. It was obtained from the south east of the island.

Delos coresia:
The only carnivorous species found, occurs only in localities which support dense populations of snails near Islington Bay.

Laoma ariel:
This species is found in considerable numbers at Boulder Bay. An introduced slug (Limax sp.) is to be found in a few localities, i.e. near Islington, The Wrecks, Rangitoto and Black Rocks. It is by no means plentiful.

N.W. & E.N. GARDNER

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Snails previously recorded from Motutapu (See Suter's Manual):

Phenacohelix chordata (Pfr.)
" ponsonbyi (Suter)
Mocella cogitata maculata (Suter)
Delos coresia (Gray)

During 1943 the only species that could be located on the island were Laoma poecilosticta, Laoma ariel and Paraloma lateumbilicata.

* * * * * * * * * *

HOW I DISCOVERED HELICELLA CAPERATA AT THAMES COAST

One day on a grassy patch at Waikawau, Thames Coast, I idly picked up a piece of board, and underneath were four small snails. They looked out of the ordinary to me, so I put them in a box. Next time I was there I thought it might be as well to look for some more. They were plentiful anywhere it was damp - under rotting logs, pieces of tin and even an old sack.

This European snail, like Helix aspersa, has been introduced to many countries in the world, and in New Zealand has been found at places in both the North and South Islands.

At Waikawau, besides snails there were spiders, centipedes, black beetles and quite a number of unknown (to me) insects. One day, under a log, I saw two evil looking lizards about six inches in length.

M. MOORE

* * * * * * * * * *

A TRIP TO CORNWALLIS

Hearing that Cornwallis in October was a good place to collect Monoplex parthenopeus, we went recently on a beautifully fine day.

We arrived an hour or so before low tide, and worked our way round the rocks at the far end of the beach - I believe the Monoplex come up in spring to lay their eggs - but whether we were too early or too late, or looked in the wrong places, not one did we see!

Nevertheless, we had a most interesting and enjoyable day. We found quite a number of pink sea slugs under small rocks, and there were of course numbers of limpets. I also found a small Cabestana spengleri. Many large Neothais scalaris were laying their eggs under large rocks and ledges. These shells were very rough on the outside, but quite nice inside.

I also found a live Maurea punctulata and one with a hermit crab installed.

But the find of the day was a large Maurea tigris which I found crawling on a tiny ledge, very high up, well above high water mark. The ledge was some six feet above a deep pool. I held my breath and extended my hand to grasp the shell - one slip and it was goodbye! For it would have been impossible to have rescued it from the pool. But my luck was in and I secured this specimen for my collection.

I also found quite a number of nicely marked Paphirus largillierti alive in the sandy mud under a rock.

There were quite a nice lot of Cryptoconchus porosus and one specimen collected was the largest I have ever seen.

On the opposite end of the beach many Maoricolpus roseus manukauensis were washed in, quite a few being good specimens.

Cornwallis is quite a pretty place, with many nice residences and baches, and though the road to it has numerous twists and turns, the surface is good. It is quite a worthwhile beach for a day's outing.

PHYLLIS M. JAMES

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A COLLECTION OF TROCHIDAE FROM THE OMAHA DISTRICT

Though many of the various species of Trochidae are often the most abundant of our marine shells, there is no reason why they should be overlooked on that account. Despite their generally small size, many varieties are of remarkable beauty, and all species are worthy of careful study.

Up here at Leigh the genus is well represented, so I am in the happy position of being able to make quite a specialized collection of these lovely shells. Some of them were mentioned in my article in Bulletin No.4, but I think they are well worth describing again.

The coastal beaches between Goat Island and Pakiri are the best collecting places, and here one finds two very pretty species in large quantities. These are Michrelenchus oliveri and Cantharidella tessellata. M. oliveri is mostly found on seaweed at low water, and though the shells are often encrusted, good clean ones are very common. The usual

colour is red or reddish-green, but sometimes they are blotched with white while others are bluish-black or even bright orange. C. tessellata is even more varied, and in a very large series I have made of this species is to be found nearly every colour one can think of. Some are uniformly one shade all over, while others show the tessellated pattern in strikingly contrasted colour-schemes. These shells are very common on seaweed as well as on clean stones at low water mark, where they can be collected by the dozen. The size usually ranges from 5 x 5 mm to 9 x 7 mm, though the smaller ones are the more common. At Te Rore Beach many are found washed up in shell sand.

Also washed ashore at Te Rore are two rare species -- Paraclanculus peccatus and Thoristella carmesina. Only empty shells have been found though they were in quite good condition. T. carmesina is a small shell similar to T. oppressa in size and shape, except that the whorls are not "stepped" and the colour is more variable. They are mostly bright red, but one I have is bluish-green with tiny white splashes, and two others were pale brown with reddish dots and lines. The base of the shell is pale brown. Paraclanculus is larger, a roughish shell which is brown with white markings dotted round the whorls. I have found 3 of them at Kempts' Beach, too, so they appear to be somewhat more widely distributed than T. carmesina.

Another rarity in the same localities is Trochus tiaratus, of which only half a dozen or so empty shells have been found cast ashore. But at Whangateau Ocean Beach, which is to the south of Leigh, the species is quite common, numbers of live shells being found on small stones at low water. The species is often washed ashore in quantities after easterly gales, and old specimens are nearly always available at high water mark.

The companion species, T. viridis, is common everywhere. Small specimens are often very pretty, being bright green with pink or red dots sprinkled over the topmost whorls. Some I have are pink or brown, without the slightest trace of green, though these are not often met with. They are otherwise identical, so there is no doubt about their being of the viridis species. Some very large specimens are found occasionally, but these are nearly always encrusted and in poor condition.

Thoristella oppressa is common under stones at Goat Island Beach, and is also found on the roots of seaweed. Specimens are nearly always dark green when alive, though many show traces of red as well. Dead shells often become yellow with a red spire, and make an attractive variation to a display of the species. Locally, the largest specimens attain a size of 7 x 6 mm.

On seaweed at Goat Island are Cantharidus opalus, C. purpuratus, and Michrelenchus dilatatus. C. opalus is quite common in places though not usually as abundant as the other two species. It appears to frequent quite shallow places during the winter months, returning to deeper water during the warm weather. As a rule one finds several specimens living close together on the one piece of seaweed. M. dilatatus is worth noticing for the fiery opal colouring within the aperture, which makes it one of our most beautiful shells. Externally they are pink, though varieties often occur, such as blue-black ones, or those with white zig-zag patterns round the whorls. C. purpuratus is nearly always the same greyish colour outside, though lately I have been able to form a series of the bright rose varieties, which are rather uncommon.

So far no Michrelenchus huttoni have been found locally, though they are common further down the coast at Waiwera. However, M. rufozonus is often washed up at Whangateau and more rarely in places near Goat Island. The species appears to

live in shallow water and is cast ashore after a blow, when live specimens can sometimes be obtained.

At To Rere Beach live two somewhat elusive species - Cavodiloma coracina and Fossarina rimata. C. coracina is of very local occurrence and lives on some large smooth stones which are half buried in the sand. Quite large specimens are common, and are usually bright green in colour, while others are marbled over with darker green markings. I have a few which are flecked with white, but they are rather rare. Fossarina rimata is also green, with black markings, and mostly lives under small stones, but the biggest I have were washed ashore, presumably from deeper water. The shells are fairly common and as a rule are found living together in small colonies.

The best place to collect Melagraphia aethiops is at Ti Point, where fine big specimens are common in shady places under overhanging boulders. Elsewhere they are eroded and dull, but at Ti Point the shells are well marked and are generally in very good condition. In the same locality Zediloma atrovirens is very common too, mostly being found near high tide mark. Specimens which measure nearly an inch in diameter are often found, though smaller ones are more easily obtainable. Further along, in Whangateau Harbour, Zediloma subrostrata occurs in hoardes, the largest ones being found in brackish water where the creeks flow into the sea. These are always eroded, and perfect specimens are to be found further away from the fresh water. The species is also common in the sandy lagoon at Pakiri, but these are not so well marked as those from Whangateau, which show quite pretty colouring, mostly black and yellow, with an occasional touch of green.

Zediloma digna is found near, or at, high water mark from Goat Island to Kempts' Beach, and is found on dead seaweed in great numbers. Some are right out in the open and are quite bluish in colour, but those from amongst the stones are black or a very dark brown. Two I have are freaks, being bright purple. The operculum is bright yellow, like most of the allied species. The animal is very active, and can move very quickly when threatened with capture.

Z. arida is found in numbers on this same coastline, but lives near to low water mark on smooth clean stones. Good clean specimens are obtainable here, and the aperture of this species is particularly pretty, being very iridescent and shiny.

Lastly we have Ansidiloma lugubris, common under intertidal rocks, and found throughout the district. They are mostly spotted with yellow, which gives an appearance of imitation tortoise shell to some specimens. One found washed ashore is quite a freak, being bright pink with orange spots, and is a most attractive shell. The aperture of the species is very pearly; externally the shell is covered with solid looking granules which are more pronounced on specimens living on the open coast than those from the harbours.

These are only brief descriptions of these very interesting shells, but I hope they will prove that even a casual study of Trochidae is well worth while.

T. P. WARREN

MAN AND MOLLUSCS

No one can say when the human race first began to take notice of mollusca, but we may be sure the earliest interest was of a culinary nature. If ever the people of Colchester erect a statue to the first man to open an oyster they will have to go very far back into pre-history to find their subject.

In this connection the mind at once turns to the famous "kitchen middens" of the Danish coast. For many years they were thought to be raised sea beaches until the presence of artifacts, burnt bones, etc., revealed their artificial origin.

Before discussing them it may be of interest to go a little further into the history of the Baltic area. As the great Scandinavian ice sheet began to retreat about 10,000 B.C. the Baltic Basin became a fresh water lake blocked to the north by ice and moraines.

Later a subsidence of land in the north allowed the waters of the Arctic to flow in and form what is called the Yoldia Sea from the presence of a characteristic mollusc Yoldia arctica. Then about 7,000 B.C. the land rose again, forming a lake known as the Ancylus lake after the freshwater mollusc of that name. The arctic conditions were eased during the time of the Ancylus Lake and trees (pines) worked their way up from the south.

A further sinking of land took place about 4,000 B.C., but this time in the southwest, letting in the waters of the Atlantic through a wide gap. The Ancylus Lake now becomes the Littorina Sea, so called from the presence of Littorina litorea, and to this period the kitchen middens belong. The climate was slightly warmer than it is today and deciduous trees replaced the firs.

The middens or shell mounds are very extensive and up to 20 ft. thick. A notable feature is the occurrence of oysters and full grown shells of other species which cannot thrive in the now brackish waters of the Baltic, thus indicating a much wider entrance than the present one through the Kattegat.

Of similar date are certain deposits associated chiefly with the Spanish province of Asturias, where vast quantities of shells have been thrown into caves which evidently acted as rubbish pits. Here again we see signs of climatic change in the presence of certain Trochus sp. more common in warmer waters today.

But it is not necessary to go back to mesolithic times to find evidence of large scale shell fish consumption Shell mounds occur all over the world, and in New Zealand are associated with the Maoris of only a few generations back, while in Patagonia they may still be seen in the making. One always thinks of seashells in connection with shell mounds, but De Morgan mentions pre-historic deposits in Algeria where all the shells are of one species of Helix. There could surely be no more striking example of the abundance of these snails in the semi-desert regions of North Africa.

As culture advances we find shell fish becoming less a staple diet and more of a luxury. The ancient Greeks esteemed the squid as their descendants do to this day, but it was the more indulgent Romans who raised mollusca to the realm of really princely foods. They distinguished between the products of different districts, the snails of some localities acquiring great fame, while their discovery of the superior merits of the British oyster is well known. They were

probably the first people to cultivate oysters and attempts were made to establish the British variety in Italian waters.

Before leaving this subject it may be of interest to mention the extraordinary diversity of opinion as to what is meat and what not. Prejudice carries through the centuries and what one nation regards as succulent another may abhor. Consider the snail and the two very different schools of thought in England and France. The edible snail is said to have been introduced into Britain by the Romans, but it never became popular with the natives (though slugs used to be swallowed whole as a cure for rheumatism).

The octopus and squid are relished in the Mediterranean but not in Northern Europe. Perhaps the most noteworthy and also the longest standing prejudice in history concerns the genera Mya and Mytilus which occur on both sides of the Atlantic, yet the former is eaten only in America and the latter only in Europe. The European distrust of Mya extends back to the kitchen middens, while the pre-Columbian Americans eschewed Mytilus but esteemed the clam Mya arenaria. Further, when Europeans arrived in the New World they were quick to adopt the "clam bake", but in doing so deserted their old friend the sea-mussel, which still has no dollar market.

Turning away from the gastronomic aspect to study the rise of aesthetic appreciation in man it is not surprising to find that shells were early admired for their beauty and figure among the most ancient artistic forms. There is quite a good deal of conchology bound up with the art and mythology of ancient cultures.

Some very fine vases have been recovered from the Aegean area dating back to the 16th Century B.C., with wonderfully virile representations of octopus and squids. Just why the pre-Dorian potters loved to depict these rather unlovely animals I have not been able to discover, but barbaric people the world over have always delighted in vigorous motives. These writhing cephalopods are obviously one in spirit with the snakey monsters of later Northern European and Scythian art.

The squid Sepia officinalis yielded an important pigment which has remained in use to this day, and cuttlebone had many ancient uses in medicine and as a cosmetic. Most famous of all ancient shell products, however, was the Purple of Tyre. The Phoenicians are supposed to have been the first to prepare this dye on a commercial scale, but they took the process with them to their colonies, particularly Carthage, where it continued to flourish long after the fall of Tyrian sea power. Carthage in its turn was destroyed by the Romans and after the collapse of the Roman Empire barbarism descended upon the Mediterranean. The purple dye industry faded out and records of it are few, but according to Pliny the dye was extracted from a gland in the head of two distinct molluscs, one which he calls the 'buccinum' (Purpura haemastoma) and the 'purpura' (Murex brandaris). The colour produced was a deep crimson and it appeared after the dyed cloth had been exposed to bright sunlight. It was most costly to prepare and became the symbol of wealth and privilege (hence 'born to the purple'). The robes worn by Cardinals of the Roman Church are in the direct line of descent from the purple of the Emperors.

Long before the development of such complex industries shells figured in the trade of primitive man. During the 1920's the writer had opportunities to see this in the New Hebrides. At that time many old tribal animosities still

persisted, and it was a common thing to find natives in the interior who had never seen the sea although only a short distance away in a straight line; yet shells, particularly Cowries, were worn as head ornaments. More notable still were the large conch shells trumpets called in pidgin English 'Bull Roarers'. No one who has travelled in the mountainous interiors of the larger Melanesian islands could fail to note or ever forget the strange haunting bellow of the bull roarers. Wherever the White man goes all day long and most of the night too the bull roarer gives the bush folk foreknowledge of his coming. He soon resigns himself to the fact that everything he does will be made known to all the people for miles around. Every village has a bull roarer for upon its warning note the safety of the tribe may depend. They are not so very common on the coast either, so they must be traded over a considerable distance, the bush folk giving sweet potatoes and certain kinds of taro peculiar to the highlands in exchange. Incidentally, the conch shell trumpet is usually shown as blown from the end like an ordinary trumpet, but this was never the case in my experience. The tip was left intact and a small hole drilled in the side of the spire about 2" from the end. When blowing a hand was placed inside the mouth of the shell and its movement gave the note a characteristic oscillating effect.

Further north in the Banks group a form of shell money was still in use when I was there. It was made by rubbing down sections of a certain marine gasteropod and stringing them on fibre. On account of its inconvertibility (soft currency?) its use was discouraged by the missionaries, who regarded its appearance on the church plate very much as army padres viewed the brass button. However, shell money was far from valueless. In some remote islands it had a peculiar prestige of its own and natives could often be induced to trade for shell when 'sillin', i.e. white man's money, produced no response.

The use of shell money is very widespread. Probably the most notable example is the cowry. It was formerly in regular use in Southern India, the common form being Cypraea moneta, but in some parts of Asia C. annulus was also used. The common cowry was reckoned at 3,840 to the rupee, so that the value of an individual shell was exceedingly small, but must have been useful in the microscopic budget of the poorest classes. The chief source of supply was the Maldive Islands, and vast quantities were imported annually.

In Africa the cowry was used on both coasts right up to the end of the 18th century. Africa also furnishes us with a case of a land snail used fiscally. In Benguella, Achatina monetaria, cut into ringlike sections, served as coin.

No account of shell money would be complete without reference to Wampum of the North American Indians, which played such a big part in trade that its value was fixed by law in New England. It was of two kinds, dark and white, the former being of most value. Dark wampum was made from the bivalve Venus mercenaria and consisted of polished beads strung together through a hole drilled in the centre. The white wampum was made from a whelk.

On the Pacific Coast a totally different coinage was used. Here the large tusk shell, Dentalium pretiosum, was threaded end to end. Its value, which is given at £50 to the fathom, was exceptionally high for shell coinage.

All the above is necessarily very sketchy, but it may serve to indicate the wide range of the subject of ethno-conchology - the study of Mollusca in relation to Man.

F. G. SHORT

MINUTE GEMS FROM SEAWEEDS

AND UNDER STONES

The usual method of collecting marine molluscs is to begin at the levels where the highest spring tides reach up the rock-strewn foreshore. One will probably encounter the most common varieties such as the Zedilomas, Cellanas, Melahaphe and other moderately sized shells. But how many have searched for those minute, delicately sculptured, and perfectly formed shells which lie hidden from sight under every small stone in rock pool and crevice? They range in size from three mm. to about one mm., and are a source of delight to those who have the aid of a low-powered microscope.

By far the greatest community of these shells is to be found browsing on the many varieties of seaweeds and other marine growths. The best method of collecting these, I have found, is to take a sugar bag and gather the weed, then wash the material in fresh water, in a shallow receptacle. The 'washings' are allowed to dry and treated as shell sand.

For those varieties living under stones a small billy is very handy and easily carried. This should be partly filled with salt water, which is easily obtained on the spot. Small stones are held firmly in the hand and allowed to hit the surface of the water, so dislodging any shells adhering to the under-side.

I shall not attempt to describe any of the species here, but a list of those, some of which are more commonly found, is provided with the localities in which I found them.

Small detailed drawings help other collectors to appreciate the beauty of these minute gems.

Species found on seaweeds:

Schismope lyallensis	-	Takapuna, Leigh - low tide.
Liotella polypleura	-	Whenarua Bay, Leigh - common.
Incisura lytteltonensis	-	Takapuna, Leigh - common.
Dardanula olivacea	-	Takapuna, Leigh - very common.
Haurakia hamiltoni	-	Leigh - common.

Further studies of material from this source will doubtless bring many more species to light, but at the moment these are all I have been able to name.

Species found under small stones:

Scrobs hedleyi	-	Takapuna, Leigh - common.
Scrobs hedleyi angulatus	-	Leigh - one live specimen.
Scrobs ovatus	-	Leigh - two dead specimens.
Estea zosterophila	-	Takapuna, Leigh - common.
Estea minor	-	Takapuna - common.
Estea impressa	-	Leigh - not uncommon.
Notosinister ampulus	-	Leigh - " "
Austronoba candidissima	-	Takapuna, Leigh.
Subonoba fumata	-	Leigh.
Teretianax pagoda	-	Leigh - two dead specimens.
Argalista nana	-	Leigh (found with Marginella cairoma)
Orbitestella vera	-	Takapuna, Leigh - uncommon alive.
Lodderia waitemata	-	Takapuna, Leigh.
Caecum digitulum	-	Takapuna, Leigh - very common.
Rangitotoa insularis	-	Rangitoto Island.
Leuconopsis obsoleta	-	Takapuna, Cheltenham - Found under ledges of rock or on roofs of small caverns in shady damp places.

A. K. HIPKINS

With every good wish for
from your friend
Ida Worthy
Paturoa
N.Z.

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AUG 12 1974

AUCKLAND MUSEUM
CONCHOLOGY CLUB

BULLETIN No. 6, NOV. 1950 AUCKLAND, NEW ZEALAND

AUCKLAND MUSEUM CONCHOLOGY CLUB

BULLETIN NO. 6.

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Our Bulletin appears again in modest form, but we are sure that the articles contributed by members throughout New Zealand will prove informative and most enjoyable. Members may be interested to know that reports from various parts of the world indicate that the Bulletin is being much appreciated by overseas collectors. We are pleased to say that the Club membership is continuing to grow, and now amounts to over eighty. The monthly meetings have been very well attended, but so far no organized field days have been arranged this year. The Committee would like to see members, particularly country members, make greater use of the Club library and also the book exchange.

During the year two very good papers have made their appearance, one of these being a further paper by Mr. A.W.B. Powell on Paryphantidae. Of special note to local members is the section dealing with new species of the genus Schizoglossa. Collectors of marine shells will no doubt be interested in a review of the genus Calliostomatidae by Mr. R. K. Dell. Several new species have been described in the paper also.

Members are urged when out marine collecting to be sure to turn back rocks where possible, so that the balance of the marine communities is not unduly upset. Unless we all make an effort to carry this out, good hunting grounds will be destroyed through thoughtlessness.

We wish to thank Mr. A.W.B. Powell for his suggestions and invaluable help, the committee who selected the articles for this bulletin, and particularly Miss P. Boyd who has cut the stencils and run off over 130 copies for us.

E.N. & N.W. GARDNER

Co-editors
1st November 1950

COLOUR VARIATION IN PTERONOTUS (PTEROCHELUS) EOS

(HUTTON 1873)

by J. S. Richardson

Recent collecting in Doubtless Bay has proved that this species is far more plentiful than was previously thought. In this locality the species is found in various types of low-tidal rock associations.

A very recent excursion to the outer southern arm of the bay, in the vicinity of Shag Point, has resulted in the finding of a further thirteen live specimens. These shells differ somewhat from the Whatuwhiwhi specimens both in colour and size.

The normal colour for Pteronotus eos is pink, and Suter mentions its "bright yellowish pink" colour: I have seen specimens from the Bay of Islands, Mangaroa, and one from Cape Maria van Diemen, all of which were of this usual pinky colour. Another record from Taupo Bay on the northern outer Mangaroa coast has been described to me as being pink. It would appear that this is the usual colour for all specimens so far recorded, other than within Doubtless Bay. Live specimens have been found at Cape Colville, but it is not known if these specimens are anything but pink.

Those specimens from Whatuwhiwhi are a characteristic orange-yellow. Primary whorls are often a creamy buff, but the body whorl usually holds the brilliant colour. Specimens from this area seem to prefer the underside of rocks away from sand in sheltered channels and clefts, although two or three of the finest were found in open water on the ground rock. Sizes up to 24 mm. length.

The Shag Point specimens are the same orange-yellow, with a noticeable darkening to a burnt sienna colour. Also, all these specimens have the sculptured depressions of the varices coloured by lines of purple, and incidental splashes of purple are not uncommon elsewhere on the shell. Morphologically these are identical with those from Whatuwhiwhi. Shells up to 29.5 mm. in length have been collected.

The habitat of the Shag Point, Waiau, specimens is quite different. In this area the Pteronotus live under rocks held together with mud, Hormosira and several brown seaweeds. The majority of the specimens were found in this muddy-rock, low-tidal area. Most were found six inches to a foot above low-tidal level on 30th July. So covered with mud were most

of the specimens that often it was necessary to feel rather than look for them. Others again chose the outer, less muddy, somewhat sandy, lower tidal rocks.

Associated with Pteronotus were many Scutus, Tugali and sea squirts. The species appears much more plentiful than Murexsul mariae and Aoteadrillia rawitensis, which occur very rarely with it. Hiatella, Herpetopoma, and Anomia are commonly found on the same stones with this shell.

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TETHYS TRYONI

By Wm. P. Thomson

The writer first made the acquaintance of these some years ago when searching the foreshore at Buffalo Beach, Whitianga.

Seeing an unusual looking object, I picked up what appeared to be a soft brownish slug of no particular shape, but I quickly realised that there was something hard inside it and immediately set about to see if I could find some more.

It was getting dusk, but with careful searching I was successful in finding one or two specimens - larger, and in better shape and condition.

Not having seen these creatures before I did not know what I had found, so carefully carried them to my tent for close inspection in the bright light of an electric lead.

The first thing I found was that my hands were stained with a bright purple dye which could not easily be removed. The animal itself proved to be a beautiful thing of a deep brown to a reddish purple colour, with a frilled mantle open across the back and which was finely marked so as to give it a lace-edged appearance.

The nature of the hard object inside was, of course, what I was most anxious to learn; however, I first sketched the animal as a possible aid to its identification. Reference later to Suter's Manual quickly established what it was.

Daybreak next morning found me out looking for more of these creatures, and by walking up and down that beach, night and morning, for the three days I was able to stay there, I came away with some 48 to 50 specimens, all found amongst drifting seaweed at high tide. The frail, semi-opaque, horny brown shells which they contained were to me a rare find.

I often wondered where the natural haunts of this mollusc would be. I imagined that most likely they would live amongst sea-weed on some rocky foreshore, and that they would be free-moving, if not altogether free-swimming.

The next acquaintance I made with them was years later when one was picked up on the beach at Cable Bay, Mangonui; and on that occasion there was little of the animal left. That was in January 1949. Twelve months later, collecting in the same neighbourhood, I was making a search of the rocks at the mouth of the Taipa River, when at dead low water, spring tide, I came across a colony of nine of them.

They were all together in a group, under a rock ledge, and below water level. Feeling about with my hands, I wondered what the objects were, for, while soft-bodied, they seemed fairly firm to the touch; also they had a good hold on the rock, and did not readily let go.

I was naturally delighted with my find; more so because I had come across them living in their natural haunts, which after all gives more satisfaction to the collector than the actual possession of the specimens.

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IN SEARCH OF

THE MAYOR ISLAND PAPER NAUTILUS

By Gordon Williams

Tuhua of Maori times, named Mayor Island by Captain Cook when he passed by it on 3rd November, 1769, is one of the breeding places of the Paper Nautilus, Argonauta tuberculata and Argonauta nodosa. The island is situated some 23 miles north of Mount Maunganui, the area being 3154 acres with a coastline of 11 miles; the highest point, Opuahau, is 1274 feet above sea level. Tuhua was the Maori name for obsidian or volcanic glass for which the island is noted; black seams glistening in the sun can be seen following the undulations of the strata in the cliffs which form most of the coastline

My first visit to Mayor Island was made in the "Dawn", a small launch built especially for hapuku fishing. After waiting for three days at Mt. Maunganui for suitable weather we set out on 21st November 1946. The weather was calm, the sun warm, the engine ran smoothly and I dreamed of Nautilus shells by the bucket full. A four hour run with a break for tea brought us to the island of my dreams - and of ancient Maori history. Opo Bay opened, as it were, from the cliff face in all its natural beauty of crescent beach and flowering pohutukawas. Kenny and I were put ashore in the dinghy and soon settled down in comfortable quarters, but unfortunately Kenny had to retire to bed with a temperature, refusing even a cup of tea. Alan and Andy had their bunks on board and stayed out in the bay. At midnight down came the rain, and continued for 24 hours. Next morning at 4 a.m. tui and makomako began their morning song, rain or no rain, and they must be heard to be believed. It is not only their lovely liquid notes, but the volume of sound that is so impressive.

Kenny would not take tea at 6 a.m., and looked flushed, so he stayed in bed and we hoped for the best. During the afternoon Alan and Andy came ashore and told us that they would have to get out of the bay as it looked like a south-easter coming up; after they went it seemed a bit lonely on this uninhabited island with a sick companion and no communication with the outside world, but after a cup of tea and a pipe things didn't seem so bad. A short walk in the rain disclosed a place to bury Kenny - nice soft sand, easy digging and a beautiful view of the bay from under a spreading pohutukawa. This was very cheering. At midnight a sudden quietness on the roof tempted me to look out and, to my relief, stars were shining and Kenny was sleeping peacefully. A glorious morning, cloudless and still, changed the gloom of yesterday to sunshine. Kenny was better and after breakfast an inspection of both beaches produced several Nautilus shells. As there was still a big sea running and it was quite on the cards that we might have to stay several days, it was clearly

indicated that something must be done to supplement our rations. We had lines but no bait until a dead maomao on the beach supplied our needs, and very soon four large snapper averaging about 12 pounds weight were flopping on the beach.

The "Dawn" returned that afternoon to Opo Bay, and as the sea was rapidly going down it was arranged to go for hapuku the next day if the improvement continued. It did, and after combing the beach for shells and making the camp shipshape, the dinghy came ashore and took us on board. The sea was still rather rough but there was little wind and warm sun, so, with Andy at the wheel, we set out for the hapuku reef, the locality of which is known only to our two hosts. At 1.30 p.m. the anchor went down with nearly a quarter of a mile of rope. It must be remembered that this launch was designed and built by Alan and Andy specially for hapuku fishing; forward is the cabin with two bunks and a small wood burning stove, amid-ship is a large ice-well to take the fish, and aft the cockpit with wheel-house just above it. On the deck on each side of the cockpit a steel frame to hold a large wooden reel is rivetted to the deck. The reels, of which there were plenty, each carried about 250 yards of strong hapuku line and on being clamped to the deck in the steel frame and winding handle fitted, only required the trace of hooks, bait and sinker, to go into action. The traces, made of twisted wire, each carried eight five-inch hooks two feet apart, the sinker being ten pounds of scrap iron. On being dropped overboard the line ran out till bottom was found. When it was thought that two or more hapuku were hooked the winding up began with much anxious peering over the side as the reel filled with line.

The first line up produced two hapuku, one about 100 pounds and the other on the 60 pound mark; and so it went on until sunset, when 16 large hapuku were in the ice-well besides several sharks and a trumpeter or two. An incident worth recording was the recovery of a huge hapuku which got off the hook and drifted astern before it could be gaffed. There was a current running and it hurt me to see such a beauty lost. In my innocence I suggested that I go after the stray in the dinghy. It looked like a huge bladder floating on the surface. My suggestion drew scornful remarks about a dinghy not being able to live three minutes in such a sea. Well that was that, and, feeling about the size of a sardine, I decided to keep my mouth shut and my eyes open in future. Pulling up the anchor was out of the question as it would take too much time, but Alan, a man of infinite resource, was not going to see so much good meat wasted without an effort. The anchor rope was released from the deck and cast overboard with a life-belt tied to it. Andy had the engine running, and half a mile astern the corpse was recovered. "Yes" thought I (mark you, my mouth was kept shut this time) "a large fish floating belly up is not a bad mark, but what about a tiny lifebelt in a big sea?" Andy didn't even look for it, he just took his original marks for the reef and there was the belt. The recovery of this beautiful fish pleased me more than the catching of the two I pulled up on a hand line. It should be explained that a hapuku coming up from deep water cannot live, in fact it is nearly dead when it breaks surface. It is as well to watch your step on a hapuku launch to avoid being hooked. Bundles of hooks, large and small, hang from every available projection and the cockpit is littered with them. It's a tough school and it's as well to look before grabbing at random to steady yourself, or even before leaning back or sitting down.

So much for my first visit to Mayor Island in quest of Nautilus shells. On many occasions since then I have seen them there at odd times, mostly November and December when they come in to deposit their eggs. On 9th November 1949, while gutting some 30 kingfish caught on the north side of Mayor Island, I discovered that every fish had from one to five Nautilus animals with fragments of shell inside it, and as the kingfish were schooling in thousands one wonders what the mortality amongst the Nautilus must have been. As the shells have a certain commercial value I suggested to my fisherman friends that it might be worth while keeping an eye on the beaches until the end of December.

On 23rd December 1949, three days after the new moon, with a very low tide and calm sea and only a light N.W. breeze, Alan and his son Athol called in at Western Bay, Mayor Island, and found Nautilus coming ashore in thousands. In knee deep water close to the shore the shells formed a white band about ten yards wide stretching for about 100 yards along the beach. Most of the shells had the animal and eggs intact. Some distance further out in deeper water there was only an odd shell or two. When approached the animals shot backwards, using jet propulsion with some considerable force, and, from what appeared to be a separate jet, emitting sepia in a dark cloud to disguise their whereabouts.

In a live state the shells appeared much stronger and tougher than dead specimens found on the beach and if, under jet propulsion, the shell was bashed against a rock no harm resulted nor did a shell dropped on the beach break. Only very occasionally did the shells come to the surface and, when disturbed, propelled themselves along using their arms as paddles. The animal attached itself to its shell by means of a fleshy mantle on each side which covered most of the side of the shell and the whole animal, including mantle, could be retracted into the shell at will. The eggs were in the upper portion of the spire under the animal. When moving through the water the mouth of the animal was always turned upwards.

Alan and Athol collected between eight and nine hundred shells, only taking the best specimens all of which had the animal in them. Unfortunately I missed this show and the above account was given to me by Alan when he returned to Mount Maunganui and telephoned me to come and see the shells being washed in Mrs. Alan's wash tubs.

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A TRIP TO OREWA, May 1950

By T. P. Warren

On Saturday, 13th May, I went down to Orewa to spend the week end with some friends, and while there had ample opportunity to do quite a bit of collecting in this locality. The shells I brought away, together with the evidence of others that I found there, are convincing proof that this can, on occasions, be a very good place to collect, and I am looking forward to a return visit to this area.

I arrived at Orewa on a warm though overcast morning, and after a welcome cup of tea set off to explore the beach accompanied by one of my friends, who is very helpful in finding shells for me though he is not a collector himself. There had been mild easterly weather for 3 days before we arrived so there were plenty of 'washups' on the sand. The first find was Angulus gaimardi, which is very rare at Leigh, but here there were hosts of them, together with large

numbers of small Mactra discors, adult Dosinia lambata and D. subrosea, Paphies largillierti with attractive grey markings and numbers of Struthiolaria papulosa and S. vermia, some of which were still alive. The S. papulosa here are not as brightly coloured as the Leigh ones, and appear to be more solid, with a more depressed spire.

Near low water mark were masses of tangled kelp and sticks, and among these were numbers of nicely mottled Cominella maculosa and C. adspersa all alive, and quite big examples. Further searching brought to light a few Gari lineolata, some Soletellina nitida which are the biggest I have ever found, two or three live Baryspira mucronata and some B. australis which were busily digging into the sand in company with plenty of big fat Amphidesma subtriangulatum. We also found a battered Maurea pellucida, two rather old Pupa kirki which I have not collected before, and two Verconella adusta which were old shells, but worth mentioning because they have very depressed spires, quite different from others I have seen from other places.

Walking along the beach we came across a few Bassina yatei, and a number of fragmentary pieces of Offadesma angasi, but alas, no complete shells were seen, though I am told they are sometimes found on rare occasions. Other shells scattered about were Quibulla quoyi, a few Janthina exigua, lots of old Zeacolpus fulminatus, and two empty Phenatoma zelandica.

Next we tried our luck at the river bank on the southern side. Down among the rocks are good specimens of Zeacumantus subcarinatus, Lepsiella scobina albomarginata, Buccinulum multilineum, and funny little squat Cominella virgata which look more like some Buccinulum species than anything else. In the sand were some Cirsotrema zelebori and Baryspira australis, and at high water mark we sorted out numbers of Epitonium phillippinarium from the 'washups'.

At the bottom of the cliffs is a little cave, and here I found some Melaharphe cincta, which are small, but really perfect specimens.

In little rock pools were plenty of hermit crabs, who furnished several good and useful specimens including two Antimelatoma buchanani maorum, some Neoguraleus sp., several Phenatoma zelandica, two quite good Pupa kirki, a lot of Baryspira depressa, some Pervicacia tristis, and numerous Buccinulum sp..

On the rocks were good specimens of Notoacmaea helmsi and Cellana radians, while at the foot of the cliffs we found some bright little Melaharphe oliveri.

It is interesting to note that Trochidae are most uncommon in this area. Apart from one or two Zediloma species which are fairly abundant on the stones near the river, the only others we found were a few Michrelenchus huttoni and two or three Cantharidus purpuratus washed up; even these were somewhat faded specimens.

Round the point from Orewa is Red Beach, which takes its name from the rusty looking red-brown sand there. This place is popular with bathers, but appears to be almost devoid of shells, the only ones in evidence being some of the more common bivalves. On the way back we had a look at a small reef that juts out from the point, and here we found one or two Bassina yatei, some Prototheca crassicosta and Zelithophaga truncata in the soft rock, while under some small stones were a few Notopaphia elegans and some Neothais scalaris, juveniles of the latter being most attractive shells.

I was rather sorry when Sunday evening came, as I had to catch the bus home again. However, I feel I collected enough interesting shells to make the visit well worth while, apart from the pleasant time spent with my friends; and I hope to pay Orewa another visit before I'm much older.

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A NOTE ON THE MARINE CADDIS-FLY

By K. J. Wise

This note is about an insect, and thus diverges somewhat from the usual topics of this bulletin, but as the subject is unique I feel sure it will be of interest to explorers of the New Zealand intertidal zone.

The caddis-flies are aquatic insects, and the adults can often be seen in large numbers flying above freshwater streams at dusk. They are known all over the world and are quite common in New Zealand, where there is a multitude of fast-flowing streams.

The insect undergoes complete metamorphosis during its life history. That is, it hatches from the egg as an active larva which lives in water and is adapted for swimming or crawling. This is the feeding and growing stage which, when the larva is fully grown, passes into the dormant pupal stage, during which the whole cell structure of the body is changed, and from this the winged adult form emerges.

Caddis-flies, as a rule, inhabit fresh-water locations. A few in Europe inhabit brackish water and one species is terrestrial. It therefore came as a surprise to entomologists when, in 1882, Captain Hutton - then Professor at Canterbury College, Christchurch - announced that a caddis of purely marine habit had been discovered. It was identified as Philaniscus plebejus Walker, 1852.

The larva of this insect lives and feeds on coralline seaweed in rock pools near low-water mark in situations outside the influence of fresh water. It builds a straight, tubular case, open at both ends, of pieces of the coralline seaweed and minute sand grains. It sometimes attaches extra pieces of the seaweed onto the outside of the case; these act as camouflage. The larva is pale green and has two strong hooks on the last segment of the abdomen with which it holds on to its case. When fully grown it is about 5/16 of an inch in length and the case about ½ an inch in length. It then fixes its case firmly to the seaweed and closes both ends with silk in preparation for the pupal stage.

The pupa has very strong mandibles with which, when mature, it cuts its way out of the larval case. It then swims about for several hours before the pupal skin splits, allowing the adult to emerge.

The body and legs of the adult are a dull red and there are two pairs of greyish wings with an over-all expansion of slightly more than half an inch.

The larva is apparently to be found at all times of the year, and the adults appear in January. To my knowledge specimens have been taken in Lyttelton Harbour, on the coast outside Wellington Harbour, at Auckland, and at Waitati on the Dunedin coast. It is also found on the Australian coast.

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The following article, of particular interest to conchologists, is reproduced by permission of the Editor of the New Zealand Science Review. It appears in Vol.7, No.6, p.104, 1949.

A NOTE ON THE FEEDING HABITS OF THE PARYPHANTIDAE (MOLLUSCA) WITH SPECIAL REFERENCE TO CANNIBALISM IN RHYTIDA

By R. K. Dell

The carnivorous habits of the members of the family Paryphantidae have long been recognized although little work has been done as regards investigating the actual source of the food. Species of Paryphanta have been observed in captivity overpowering and devouring earthworms and the writer has often seen earthworm remains in the alimentary canals of animals captured in their native haunts. On the other hand, snails kept in captivity for months in damp leaf mould with no earthworms present have survived. It is possible either that Paryphanta can subsist on its fat reserves (quite possible in a creature of such sluggish habits) or that these animals can derive sufficient nourishment from the leaf mould itself or from small organisms present in it.

Schizoglossa has been known to devour smaller snails and even beetles, while Miss E. N. Houghton (1947) has recorded Delos coresia attacking at least three species of small native snails. Nothing seems to have been recorded as regards the feeding habits of species of the genus Wainuia.

With regard to Rhytida very little has been published, but the writer has been interested to discover several occurrences of cannibalism in this genus. These occurrences are listed below:

Rhytida meesoni perampla Powell. In the vicinity of Mt. Arthur, Nelson, during January, 1947, several pairs of snails were collected from a series of localities. At first it was believed that these animals were copulating, but further observation proved that one snail was attacking the other. Half devoured and almost completely eaten animals were discovered. It is noteworthy that practically all trace of calcareous matter was lacking in the shells of the animals devoured.

Rhytida australis Hutton. On Codfish Island, off the north-west coast of Stewart Island, during November, 1948, much the same state of affairs as the above was noted.

Rhytida greenwoodi (Gray). F. G. Short (1947) notes a case with this species in which cannibalism may be, at least, strongly suspected.

All the occurrences noted have been where the species was common in a moderately restricted area - e.g., the bases of several flax bushes. In the case of Rhytida meesoni perampla and Rhytida australis the shell of the attacked snail was almost entirely chitinous. The writer believes that the loss of calcareous matter occurs periodically and in Rhytida may be correlated with egg production. A large number of eggs are usually produced in this genus, each egg being encased in a comparatively thick calcareous shell. O'Connor (1945) gives a maximum number of eggs for one individual of Rhytida greenwoodi as 26, and when it is realized that the dimensions of eggs in this genus range from 2.25 mm. x 2 mm. to 5 mm. x 4 mm. it will be readily seen that a

considerable amount of calcium must be made available in the breeding season. It seems reasonable to assume that some of this calcium carbonate is obtained through re-absorption of the calcareous matter of the shell. It also seems likely that animals which have completed egg-laying, being in a generally exhausted state with depauperated shell, should fall easy prey to a stronger, more aggressive animal.

In attacking another snail the predator animal extends the muzzle, bringing the radula to bear upon the proposed victim. The attacked animal soon retracts within its shell, the attacker gradually following, devouring its victim as it progresses. At this stage the shell of the half-eaten animal, lacking the calcareous support, often collapses more or less completely.

While it is not suggested that the normal diet of Rhytida is cannibalistic, it is believed that at certain times, especially after egg-laying, cannibalism is fairly common among populous restricted colonies.

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Houghton, E.N. (1947): Bull. of Auckland Museum Conchology Club, No.3, p.20.

O'Connor, A.C. (1945): Notes on the Eggs of New Zealand Paryphantidae with Description of a New Subgenus. Trans. Roy. Soc. N.Z., 75, 54-6.

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NOTES OF INTEREST

By E. N. Gardner

Epitonium jukesianum (Forbes) can be found living amongst Corallina seaweed in rock pools between tides at Ahipara.

A recent visit to Te Hapua resulted in a find of about twenty specimens of the uncommon Notocochlis migratoria - inhabited by hermit crabs, but well marked and in fine condition.

A worn specimen of Verconella adpressa (Powell) was picked up at Scott's Point, Ninety Mile Beach, in January 1950. The only other recorded specimens were dredged off Maunganui Bluff, Ninety Mile Beach. One is in the Auckland Museum and the other two are in the collection of the late Dr. Dryer.

Four specimens of Neoguraleus manukauensis were discovered at Blockhouse Bay living among small drifts of dead cockles banked up near high tide mark. This is the first record of the species having been found alive. Notoacmea helmsi was quite common on the dead cockle shells.

Several species of small shells, inhabited by hermit crabs, but in good condition, may sometimes be found about the rocks at the southern end of Onetangi Beach; e.g. Baryspira depressa, B. novaezelandiae, Epitonium jukesianum, Phenatoma zelandica, P. novaezelandiae, Antimelatoma buchanani maorica, Maoritomella albula and Neoguraleus murdochi. Found washed up here was a peculiar Alcithoe swainsoni - more like an overgrown A. fusus.

At Onetangi, during winter months, Rhytida greenwoodi can be found living in grass and under fallen fronds of nikaus growing in the open at the edge of the bush.

Albino specimens of Ptychodon pseudoleioda (Suter) have been collected in a patch of bush near Swanson, Auckland, where they appear to be quite common.

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LIGHT WITHOUT HEAT

By Bernard J. Bowden

The ability of many organisms to produce light has, from the earliest times, attracted the attention of philosophers, and writings on the subject range from the views of Aristotle, Pliny, Robert Boyle and Isaac Newton to large numbers of papers by present day biologists and biochemists.

While the most striking exhibitions of animal light are given by organisms which occur in vast numbers, such as Protozoan Noctiluca and the Waitomo glowworm, anyone who has seen a jar full of fresh seaweed in the dark will have been amazed at the number and variety of animals which possess a "set of lights". In fact all the major phyla into which the animal kingdom is divided have some luminous forms. A few smaller groups such as the flatworms, brachiopods and rotifers have no luminous forms, but they are the exceptions. Even in the plant kingdom we have luminous fungi and bacteria.

Within the groups which do have luminous forms, however, the distribution is very unequal. Many marine worms and very many crustacea are lit up every night of their lives, but, if we except the squids, which never seem like shell fish anyway, there are only four luminous molluscs. These are a bivalve, Pholas dactylus, two sea slugs, Phyllirrhoe bucephala and Plocamopherus ocellatus, and finally our peculiar freshwater limpet, Latia neritoides. A fairly scanty and random selection.

Latia has further claims to fame. Apart from a few aquatic beetle larvae which grow up into Asiatic fireflies and always have air-filled respiratory systems, Latia is the only known freshwater luminous animal. Why this is so we cannot even guess. The structure of the cells which produce Latia's luminous slime is very similar to that of Phyllirrhoe, and it seems that the absence of luminous forms from most of the world's rivers and lakes must be caused by more than low salt concentrations.

The light of Latia for those who have not seen it, is pale green and very vivid. The light of half a dozen shaken vigorously in a small bottle is sufficient to distinguish newsprint by, so it is well worth examining next time you are passing a bush stream in the evening.

The luminescence of Latia was first recorded by Henry Suter in 1890, but subsequent writers on bioluminescence have completely overlooked his paper, and in his monograph "Living Light" Professor E. Newton Harvey, probably the greatest authority on the subject, does not even mention our glowing trout food. He is, however, repairing this omission in a new book he is writing.

The use of the light in Latia is at the moment a puzzle. This is not unusual for luminous forms - Pholas, for example, is a filter feeder and never of course emerges from its tunnel in the rock, but in other cases the light is definitely

used as a mating signal, as a lure for food, or for other specialised purposes. Latia, however, is a vegetarian, and as it is eaten by trout and eels it can hardly be a "hands off" signal equivalent to the bright warning colours of some distasteful insects. Its use as a mating signal for various reasons seems improbable.

The chemistry of luciferin and luciferase which react together with oxygen to produce this cold light has been studied extensively overseas, and for further information on this subject I heartily recommend Dr. Harvey's fascinating and extremely readable book.

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PLACOSTYLUS SNAILS OF LORD HOWE ISLAND

By E. N. & N. W. Gardner

Our interest in the Island of Lord Howe started when we were given a few bleached Placostylus snails which had been picked up by a recent visitor. We decided right away to find out something more of the natural history of this island, particularly with regard to Placostylus. In this quest we were assisted by a keen naturalist living on the island.

Lord Howe, situated some 400 miles N.E. of Sydney, is a very small island, being seven miles long and about one mile wide, yet it possesses two great mountains over 2500 feet high, both of which are at the southern end and rise almost straight up from the sea. Though there are several peaks to the north none are over 850 feet. There are several small islets separated from the mainland by very shallow water, namely Goat or Rabbit Island in the lagoon and Roach Islands on the east side.

Geologists are of the opinion that Lord Howe consisted at one time of only three or four peaks of basalt, and that the connecting terrain is of windblown marine origin. This aeolian sand piled up in the manner of most dunes, became fixed by vegetation and eventually consolidated to form a hard coral rock.

One would expect the terrestrial fauna to be closely allied to that of Australia, but this does not seem to be the case, there being in fact far more resemblance between Lord Howe and New Zealand, which is twice the distance away. Certain elements of the fauna are generally believed to have been distributed during the Cainozoic period along the now submerged Melanesian Plateau. To substantiate this, deep sea soundings reveal the existence of a series of banks of 500 to 1000 fathoms, extending from northern New Zealand to Lord Howe and from there towards New Caledonia. The sea between Lord Howe and Australia is three thousand fathoms, and is known as the Thomson Deep.

Though several papers have been written in the past, there has been little recent information on the ecology of these snails, and one wonders how they are faring and if they have been subjected to the harsh treatment our New Zealand species have had meted out to them through the agency of mankind. Fire, pigs and trampling cattle have reduced the once considerable areas occupied by the snails to a few scattered pockets.

On Lord Howe the main enemy has been the common rat which arrived in 1918 at the time the S.S. Makambo was wrecked on a nearby reef. The vessel was beached and the rats came

ashore. The rodents found conditions so much to their liking that they increased until their numbers assumed plague-like proportions. They consumed everything edible including "Kentia" palm seed, snails, lizards and even centipedes. For a while it was feared that Placostylus would be wiped out and they did in fact become very scarce, but once the rats were brought under control the snails showed signs of increasing, and their chances of survival now seem promising.

Pigs, which were introduced by early whalers, have taken their toll too. At the present time these animals are restricted to the high rugged area around Mts. Lidgbird and Gower.

Four forms have been named:

Placostylus bivaricosus, Gaskoin, 1854.
" " solida, Etheridge.
" " etheridgei, Brazier 1889.
" cuniculinsulae, Cox 1872.

A partial description of two forms, royi and belli, is given by Iredale in the Rec. Zoo. Soc. N.S.W., Vol.10, p. 309. As far as we can determine these two varieties have not been figured.

Described in 1854 by Gaskoin, Placostylus bivaricosus was then found to be very common under rocks and vegetation on most parts of the island. It is a handsome shell of 56 mm, and has a reddish brown epidermis while the aperture is deep red in colour. Because of the abrasive nature of the rocks amongst which they are concealed, a large percentage of the snails are minus this brown covering, the shell then being quite an attractive orange. The eggs are very large, at least twice the size of those laid by our larger New Zealand species. While most of the nests are found under the 'greybark' trees, a few have been located beneath the banyans. Up to twelve eggs are laid at a time.

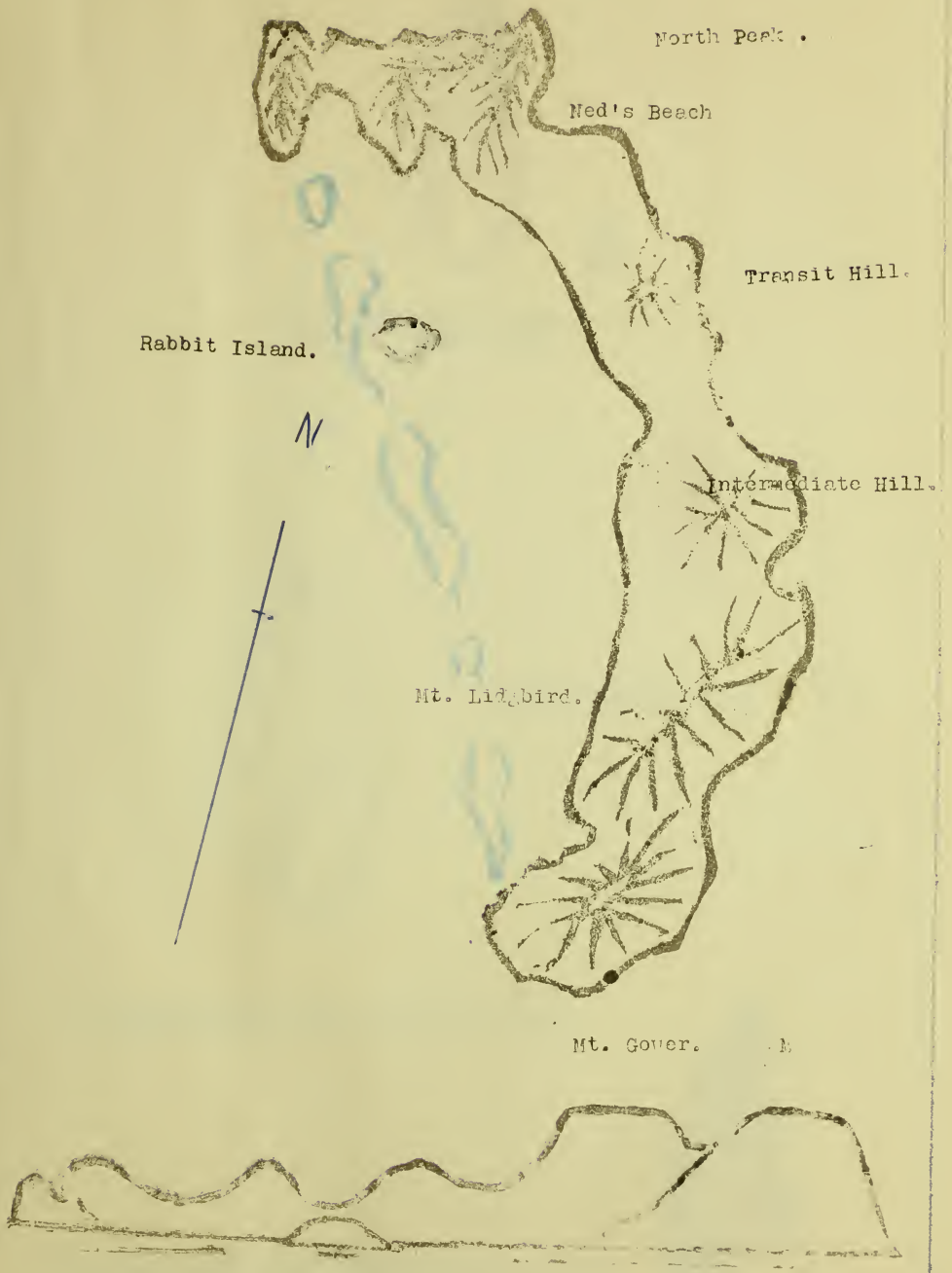
As the snails have a stout limy shell which lasts long after the animal is dead, thousands of bleached specimens are to be seen lying about, many of these having been exposed by the burrowing mutton-birds. The fact that variations of these old shells seem to occur in zones makes the study of them most interesting.

There seems little doubt that the heavy fossil shell called solida is the oldest, and that it is a shell of considerable age can be deduced from an examination of hard coral matrix in which it is firmly cemented. Typical solida measures 75 mm. x 39 mm, has a much thickened lip with deep anterior and posterior canals, ~~being~~ and is found, as far as we can ascertain, only between Brodie's Point and Ned's Beach on the east coast, which incidentally is the area of grestest elevation of the coral rock formation. These shells occur, often in considerable numbers, in the upper parts of cliff faces. Very few examples, showing a gradation from this thick form towards the recent equivalents, are obtainable anywhere in this stratum. The few that we have seen were obtained in the vicinity of Ned's Beach. While these are not a great deal bigger than the living bivaricosus, they can easily be distinguished by the aperture and lip, which are in keeping with the style of solida.

Near Stevens Point (Survey Lot 59) a distinct form is to be found in a small patch of bush near the edge of the coastal cliffs. Though most of these shells are bleached a few live ones can still be obtained. It is a comparatively narrow shell, measuring on an average 52 mm. x 20 mm. and has a small aperture with a tubercle at the base of the columella.

PLATE

LORD HOWE ISLAND.



I. S.

PLACOSTYLUS OF LORD HOWE ISLAND.

ALL FIGS. NATURAL SIZE.

Placostylus bivaricosus, Gaskoin.
and egg, natural size.

Placostylus cuniculinsulae, Cox
from Rabbit Island.

Placostylus bivaricosus solida, Etheridge.
(Sub-fossil.)

Placostylus bivaricosus etheridgei, Brazier.
Under the wall of Lidgbird.

In the more recent coastal dune formation which overlies the coral rock on the lagoon side of the island the large numbers of bleached bivaricosus found there are consistently 1/5 smaller than those found further inland. The drier conditions which would prevail in this sandy soil may have been a contributing factor in this reduction of size.

Examples from the northern end of the island on the slopes of North Peak, are squat in appearance, the most noticeable difference being in the aperture, which is rounded with weakly angled canals. Snails in this region are not common.

Slender form from near Steven's Point.

The smallest form, Placostylus cuniculinsulae, which occurs only on Rabbit Island, was very common at the end of the last century, but for some reason now seems to be practically extinct. In this case the rats cannot be blamed for they have never succeeded in getting across to this islet. It is far more likely to have been the result of fire. No living specimens have been taken in recent years, though a search just lately led to the discovery of a few dead bleached shells. About ten years ago seventeen typical bivaricosus were taken to Rabbit Island and released in an attempt to save them from rats. At the time of writing no live descendants could be found, though several dead shells were picked up. These, of course, could have belonged to the original lot.

The low-lying land which forms the "waist" connecting Transit Hill with the higher Lidgbird block is somewhat swampy and subject to flooding. This was probably the last major break in the continuity of the island; therefore south of this one would naturally expect to find some variation from the normal bivaricosus of the central and northern parts. This does occur, though there is an intrusion of the typical species across and onto the northern slope of Intermediate Hill.

In specimens from the saddle between Intermediate Hill and Lidgbird a foreign element is noticeable, the shells from here having a simple aperture - no canals or tubercles, and distinct transverse ripple marks. In these features the shells resemble etheridgei, but those obtained are constantly shorter than the type.

The subspecies etheridgei, an elongated shell up to 70 mm. in length, has been taken only from well up under the wall of Mt. Lidgbird. The colour of this fine form is said by Iredale to be almost black. It is apparently not common, there being no record of any being taken in recent years.

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TRAWLING OBSERVATIONS

By A. S. Voss

From most areas in the Bay of Plenty Verconella dilatata is trawled in depths ranging from 30 - 100 fathoms. During the past year those which have been obtained are proving very interesting. Some have been particularly big; the largest I have secured to date measures 200 x 88 mm. and is a perfect specimen, trawled at 80 fms.

Near White Island, at a station of 80 fathoms, I have been getting a fine Verconella dilatata. It is a long white shell, and at first glance looks like Verconella adusta mandarinoides. The operculum seems heavier than the usual type and what is most interesting is that the specimens are coming up only from this particular area.

Another rather beautiful shell secured is a Verconella elongata, 152 x 50 mm., trawled at 60 fathoms.

I have some good specimens of V. adusta and V. adusta mandarinoides, most of which were trawled around White Island at 45 - 50 fathoms.

The genus Alcithoe is also proving interesting. It has been noticed that these are obtained only from certain areas, two of the best being off Mayor Island and Motiti Island in up to fifty or sixty fathoms. I have some particularly large specimens of A. jaculoides, the best so far being 220 x 50 mm. trawled at 50 fathoms. In the same spot I secured an A. johnstoni of similar size. Both are perfect specimens. Small but adult A. jaculoides measuring only 50 x 25 mm. have been coming up. Bad feeding grounds, I am told, are responsible for this. Off Cape Runaway we have trawled a fair number of Alcithoe fusus; twelve, all good specimens, came up at one time.

Two interesting items which were obtained recently are a live specimen of Micantapex finlayi, and a dead specimen of Glaphyrina plicata. Another 'catch' was Dentalium marwicki, trawled at Hick's Bay, East Coast.

Not only shells come up in the nets. Many unidentified fish, crabs, starfish and dredgings from the sea bed turn up, and these are usually despatched to Mr. Powell at the Museum, as they all seem of great interest to him.

I find my hobby of the greatest interest, and would be ungrateful if I did not appreciate all the help Mr. Powell has given me in my many problems which are trawled up from the deep sea. It is a happy hobby, particularly as I have a fine skipper and crew who will take me out on the trawler any time. When aboard they will do all they can to make the trip a really good one, and I know they are as interested as I am in our 'finds'.

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A VISIT TO A CORAL ISLAND

By J. Wyatt

During my Australian holiday, I was very fortunate to be able to spend a week at Heron Island, a small cay in the Capricorn Group which lies beyond the southern tip of the Great Barrier Reef and fifty miles off the coast of Queensland. Leaving Gladstone in a launch we started on what proved to be a journey which will long be remembered by the twenty-six passengers who made it; 6½ hours of tossing on wild seas, with the added thrills of the loss of the small boat, and soon after the failure of the engines. "Heron Island had better be good after this" moaned one unhappy victim, and most of us agreed. It was a very relieved captain who landed a very wet and bedraggled company of people at Heron Island just as the dinner bell rang; but in spite of the fact that no one had tasted food for over nine hours, there was no immediate rush to answer its call.

However, we could all laugh over our experiences next morning, and settled down to enjoy our stay on a coral island.

Heron Island is quite small, only 1½ miles in circumference and fifteen feet above sea level at its highest point. It is encircled by an extensive coral reef which, at low tides, is exposed and lays bare for a short time haunts of some very lovely shellfish and many rock pools where the coral may be seen growing in all its beauty. Within the reef, at low tide, the lagoon is a fine stretch of crystal clear water, quite shallow, and here,too,many shellfish may be collected from the sandy floor or under small lumps of dead coral. Small clams abound everywhere and are really beautiful as they lie, embedded in the coral, just under the water, their shells slightly ajar and showing their beautiful mantles of rich velvety browns, greys and fawns, mottled and striped with bright blues, purples and greens. You might find three or four, all differently coloured, embedded in one piece of coral, so securely fastened by their solid fleshy stalk that it is almost impossible to remove them. Brightly coloured crabs and starfish are to be found. Beche-de-mer, ugly, drab, leathery slugs, varying in length from 6 ins. to 1 foot, and ranging in colour from cream spotted with brown, through shades of yellow and brown to black, are so abundant that one has to watch one's step to avoid stepping on them.

Unfortunately, during my stay at Heron Island the weather remained so boisterous that shell collecting on the reef itself was too risky, and the surface of the lagoon so ruffled that only in the very shallow water was the floor visible, enabling anything to be seen.

The island is heavily wooded with large Pisonia trees, patches of Pandanus trees and a heavy undergrowth of tropical shrubs. Thousands of terns and mutton birds come to the island during the summer months to breed, the terns nesting in the trees, the mutton birds occupying burrows in the ground under the trees. The whole of the island is a network of burrows.

Both male and female mutton birds share the domestic duties, taking it in turn one to care for the egg and the young and the other to spend a very long day at sea fishing. Long before daylight the mutton birds are off to sea for their daily foraging,and the terns depart at dawn. It is one of the interesting sights of the island to see these birds return in the evening. The terns, last to leave in the morning, are the first to return in great flocks at dusk, and are all safely settled in their nests before the first of the mutton birds arrive after dark. They usually circle round the

lagoon for a time before sweeping in, to land very awkwardly with a thud on the ground and waddle off, each to its own burrow; there to keep up an almost incessant wailing and moaning for the rest of their short night. Between these cries and an occasional bang on the roof, as a bird lands on it, there is little sleep for the visitor to Heron Island. The birds should have departed on their annual migration before we arrived on Heron Island, but the abnormal weather conditions had delayed their departure and gave us the opportunity of seeing a large part of the bird life of the island.

Besides the tern and mutton birds, there are reef heron (after which the island is named), sea eagles, frigate birds and of course gulls to be seen there.

Turtles in hundreds come ashore there in the breeding season to lay their eggs in the sand at the top of the beach. Each female turtle, we were told, comes ashore six or seven times during the season and lays from 100 to 200 eggs each time; ten weeks later the young turtles hatch out and make their way to the sea, usually after dark. Of the thousands and thousands of young that hatch out only a very small percentage live to breed in their turn. Birds, crabs and fish take a very heavy toll of the young before they are many hours old. We were just too late to see the young turtles make for the sea, only one evening during our stay was a belated batch seen marching down the beach. In a tank on the island three greenback and two hawksbill turtles are kept in captivity, and one has only to approach the tank for five heads to pop up, hopefully waiting for any tit-bits that may be going.

Usually fishing excursions are arranged for each day, but so heavy were the seas during our week's stay on the island that only on two days did the captain of the launch venture out of the shelter of the lagoon, and then only for a short run, but enough fish were caught during those two trips to give the guests some idea of what gorgeously coloured fish inhabit those waters. There were red emperors, silvery blue splashed with red, king schnapper, palest pink banded with crimson, coral cod, some blue finely spotted with red, others red spotted with blue; other fish were varied green and blue, and one queer specimen was creamy white decorated with polka dots of brown; but the prize of the two days fishing was a great reef cod which turned the scales at 51 lbs. No need for that proud fisherman to tell of the large one that got away.

Owing to the rough weather we were deprived of what would have been one of the high lights of the trip; the excursions out over the reef at high tide in the glass-bottomed boat to view the living coral in the deeper waters. Most of the coral within the lagoon was dead coral and lacked its beautiful colouring when growing where it remains coloured all the time.

However, we were able to view at close quarters some of its unbelievably lovely little inhabitants, the many-coloured little coral fish; quite a number of specimens of these lovely little fish are kept in an aquarium on the island, together with several varieties of brightly coloured starfish, sea slugs, sea urchins, and one large sea anemone with its accompanying anemone fish, a beautiful little velvety brown fish with a broad band of bright blue across its head and brilliant orange fins and tail. It appears to be quite immune to the sting of the anemone, which is fatal to most small fish, and hides amongst its tentacles, only emerging to lure some other species of fish within reach of its host.

During our stay on the island we were privileged to hear two very fine lectures, one on "Coral" and the other on "Turtles", both illustrated by coloured movie films, delivered by Mr. Cecil Cox, a New Zealander from Wellington, who has spent ten years studying the marine life of the Great Barrier Reef. Another evening he opened his museum and we were able to inspect a very fine collection of shells gathered in that area.

Although a disappointment as far as shell collecting was concerned, due entirely to the stormy conditions, the island held so much of interest for a lover of natural history, that Heron Island will always remain the highlight of my Australian holiday.

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COLLECTING AT KAWAU ISLAND

By Robert L. Matthews

Mrs. Matthews and I had long wanted to see something of Kawau Island. We had heard of the beauty of the place and of course of Mansion House, but as regards collecting there we had heard nothing. Mr. Powell had told us that on the ocean beaches there were large pauas and also about the Lepsiella scobina rutila species, with the orange interior. We were arranging to stay for the Easter week-end and chose Vivian Bay. This bay is well north of Mansion House on the inner coast, which gave us to think that collecting should be good because of the calmer waters. Our experience has been that open ocean beaches are not the best collecting grounds; the material being so broken by the heavy seas.

After an interesting trip we at last reached our destination - an open shingly bay with just one house on the beach. Fortunately the weather was perfect, and the scene, with the house, the bay and the hills rising gently behind, filled us with pleasurable anticipation for a successful three days' holiday.

However, we wasted no time, fearing that the weather would break, and started our searching for specimens without delay. The rocks at each end of the beach were covered with oysters. At one point at the northern end of the bay and at high water mark we found Lepsiella scobina rutila living with the albomarginata which is really surprising, as one would think that the orange interior of the rutila was caused by feeding ground.

We found:

the small mussel	68	Trichomusculus barbatus
	360	Anisodiloma lugubris
	1088	Verconella adusta
	869	Mayena australasia
	1332	Daphnella cancellata
	1045	Buccinulum lineum
	1071	" heteromorphum
	1025	Taron dubius
	381	Herpetopoma bella
	79	Chlamys zealandona

We enquired about getting to the ocean beaches, but the people at the house were not at all helpful. Apparently Kawau today has reverted to heavy tea-tree growth and to get anywhere one has to find a way through dense scrub. However, we ventured off and after much walking and getting lost we found an open ocean beach. But there, as usual in our experience, we found absolutely nothing. On another occasion

we found a small bay at the mouth of a creek, and there found well up at high tide mark and under shingle twenty-five Maruwila filholi Hutton and a tiny gasteropod that we have yet to get identified.

We had one wet day in the three days of our stay, and the weather was good for the time of the year. So we farewelled Kawau, intending next time to do the southern end of the island.

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COLLECTING IN DOUBTLESS BAY

By E. S. Richardson

On the south-eastern side of Rangiawhia Peninsula extends a somewhat large, crescent-shaped, sandy beach called Tokerau, which terminates in the first of many rocky points dividing the coastline between here and Mangonui Harbour into numerous rocky or sandy bays and inlets. On the opposite side of the harbour from Bergen's Point there are only a few sandy beaches, and for the remainder, rocky platforms and reefs, the outer edges of which disappear into very deep water. In between is the muddy Mangonui estuary with its entirely different fauna. Collecting in this area is, as may be expected, quite varied. Conditions vary from brackish to clear ocean water.

Mr. A. Hancox has listed species from the Taipa Estuary and Mr. D. G. Forsyth has discussed Tokerau and Whatuwhiwhi in Bulletins No.4 and No.3 of this Club, and in these articles is mentioned some of the fauna of this bay. The fauna is that known as Aupourian and is fully described by Mr. A.W.B. Powell in T.N.Z.I., V.70, pp.205-248. In this area I have visited many of the collecting grounds, but there still remains a large part that has not been investigated. The areas worthy of a visit are listed as follows:

Marine Collecting	Key
Mangonui wharf and mudflats	M.
Cooper's Beach and south reef	C.
Taipa Beach and south head rocks and dunes	T.A.
Aurere Beach and Rocks to island	
Waiau	W.
Whatuwhiwhi Reef	
Aurere Beach to Shag Point Rocks	W.H.
Tokerau Beach and dunes	T.
Land Collecting	
Bush remnants, Whatuwhiwhi	
Tokerau Pleistocene dunes	Tok.
Taipa south head bush and northern end foredune	Ta.

Other Interests
Aurere Stream mouth - Cretaceous fossils (Inoceramus and Ostrea)
Cooper's Beach - Coal and fossil plant seeds.
Tokerau sand dunes - moa remains.

Perhaps one of the most interesting groups found in this area is Buccinulidae. Species represented are:

B. multilineum aupouria (Powell)	Wh.
B. lineum (Martyn)	C, Wh, W, Ta.
B. (Euthrena) vittatum (Q.& G.)	C, W.
B. " robustum (Powell)	Wh, C, W.
B. sp. somewhat resembling the southern strebeli,	M, C, Ta, W.

B. (Evarula) multilineum aupouria (Powell). Although numerous lineum are to be found, the only record I know of from this area is that of Mr. D. G. Forsyth from Whatuwhiwhi.

Cominellidae: The species Cominella virgata has a form with rather beautiful wavy growth lines, unlike the normal spirally marked shell. Some specimens are spirally marked as juveniles but change to the axially marked form. Erosion to the basic spiral pattern is common. Found from Whangaroa to Doubtless Bay.

Agnewia tritoniformis: A further record may be added to the previous find of Mr. D. G. Forsyth at Whatuwhiwhi. A live specimen has been found at Cooper's Beach in a moderately open water situation among sand and weed under low-tide rock.

Cymatiidae: Cabestana bolteniana and C. waterhousi segregata are the only two species that I have collected in the area, the latter species being the more common. C. spengleri is, as far as I can see, not found in the Bay. Monoplex is common, as is Mayena australasia, while both Charonia capax and C. capax euclioides are frequently found, if only as eroded shells.

Ranella multinodosa is known from Tokerau Beach, where much deep water material accumulates. Of special note in this category are Xenophalium ericanum, X. powelli, Venustus cunninghami and V. pellucida spirata.

The Janthinas are rarely seen, but J. globosa seems more common than usual.

Records from Whatuwhiwhi which I have so far seen nowhere else are:

Pteronotus cos (yellow pigmented form)
Lima sydneyensis
Fusus mestayerae
Buccinulum multilineum aupouria
Marginella cairoma

A small list of some of the more interesting microscopic forms is added with reference to locality.

Anadara trapezia, subfossil	
Acar sociella	
Acar sandersonae	
Pallium convexum	
Lima sydneyensis	
Limatula maoria	
Dosinia (Phacasoma) maoriana	
Angulus spenceri	Aurere
Amphidesma (Taria) ventricosa	W.C.T.
Longimactra elongata	T.C.W.Ta.
Haliotis virginea	C.W.Ta.
Cavodiloma coracina	C.W.
Cantharidus purpuratus	Ta.C.(especially)
" opalus	C.Ta.W.T.Wh.
Venustus tigris	C.Ta.W.
V. pellucida spirata	C.Ta.T.
Modelia granosa	C.W.Ta.Wh.
Trichosirius inornata	C.W.Ta.
Ellatrivia memorata	C.Wh.
Argobuccinum tumidum	Ta.C.
Xenophalium powelli	Tok.T.
" ericanum	Tok.T.
Tonna haurakiensis	T.
Janthina globosa	T.C.Ta.
Vicimitra maoria	C.
Austromitra antipodum	Wh.C.W.
" rubiridax	Wh.C.
Buccinulum vittatum	C.W.

B. sp. (like strebeli)	W.M.C.T.
Verconella dilatata	C.
" adusta	C.W.Wh.
Cominella virgata	C.W.M.Wh.T., Whangaroa, Flat Id.
" adspersa	C.W.M.Wh.T.
" " melo	M. Whangaroa
Poirieria zelandica	Ta.
Murexsul octogonus	C.
" mariae	C.Ta.W.
Alcithoe arabica	M.
" depressa	C.W.Tok.T.Wh.
A. fusus	T.Taimaro
Baryspira mucronata	T.Tok.C.Ta.
Marginella mustellina	Wh.W.Ta.C.
Aoteadrillia rawitensis	C.Ta.
Neogyraleus whangaroaensis	W.C.
" sandersonae	C.W.
" interruptus	C.W.
" n.sp.	W.
Bullinula lineata	T.

I have no hesitation in adding that collecting in the Mangonui area of Doubtless Bay, without a doubt affords some of the best hunting I know of in New Zealand, and it is hoped that these notes may help other collectors who come here in search of northern fauna.

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